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ABSTRACT

Concerned with what can be done to help produce more thoughtful, critical readers, this report first presents an historical overview of theories on the origin of language, referring to B. F. Skinner, Noam Chomsky, and Jean Piaget, among others. It then discusses biological reasons for the evolution of language and the impact of verbal language on human cognitive development, concluding that a major function of language is to deperceptualize--to create distance from one's immediate perception of reality with the help of previous experiences and knowledge. The report suggests that poets, philosophers, theologians, artists, and scientists have learned to harness the power of the brain through language. It then cites literacy data collected by the National Assessment of Educational Progress (NAEP) indicating that students during the 1970s were perceptually bound. The perceptual theories informing reading instruction, the report claims, did not promote students' abilities to analyze texts and thus deepen their understanding. After reviewing instructional strategies and reading models based on both perceptual and cognitive theories, the report concludes that reading is a process driven by language rather than by perception or intuitive cognition, and offers suggestions for increasing the language emphasis in reading instruction. An extensive bibliography is included in the report. (MM)

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NAEP Literacy Data: Students Deficient in Using Language. Why?

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Introduction

> The overwhelming majority
> of students
> lacked strategies
> for analyzing. . .
> in the interest
> of deepening their understanding
> of what they read.
> (NAEP, 1981a, p. 1)

This interpretation of the data collected by the National Assessment of Educational Progress (NAEP) is an analysis of how 9-, 13-, and 17-year-old students responded to questions designed to get comprehension achievements at four different levels on an hierarchical scale or model.

The scaled model is:

1. Initial comprehension, leading to
2. Preliminary interpretations, followed by
3. A reexamination of the text in light of these interpretations, leading to
4. Extended and documented interpretation. (NAEP, 1981a, p. 2)

The following observations were made by Charles R. Cooper, Edward Fry and Anthony Petrosky; they are members of the NAEP Reading/Literature Advisory Committee. Cooper (NAEP, 1981b, p. 47) in giving a synthesis of the performances of 9- and 13-year-olds concluded with two disturbing questions.

> Nine-year-olds improved from 1970 to 1974. In 1974, those 9-year-olds became the age cohort of 13-year-olds to be assessed in 1979. Given the performance of 9-year-olds in 1974, we had every right to expect 13-year-olds to make a strong improvement from 1974 to 1979. *They did not.* *Why did the performance of 13-year-olds appear to reach a plateau? Why did older students in elementary school lose the momentum they gained earlier?* (Italics added.) (p. 47)

Petrosky (NAEP, 1981b, pp. 47-48) expressed his professional observation in these words:

> I am concerned that the downward trends in reading of 13- and 17-year-olds, particularly in the area of inferential comprehension, are signaling deteriorating resources and instruction for those higher-order intellectual abilities that go beyond basic skills. If these trends continue into the 1980s, then it seems plausible that we are failing to give these students anything but basic skills. (pp. 4748)

Fry (NAEP, 1981b, p. 48) observed:

> The disturbing part of these assessment results is that high school students, and particularly the best students, are not only failing to keep up with their counterparts of 10 years ago, they seem to be reading worse.

Dorothy Strickland, another member of this committee, made an observation that helped prompt the intellectual quest that produced this paper. She (NAEP, 1981b, p. 48) concluded:

As impressive as the steady growth of 9-year-olds has been, one must wonder if there is something that is or is not being done that militates against more enduring gains. We need to ask ourselves what can be done at the early stages of reading development to help produce more thoughtful, critical readers who are better prepared to shift to the more complex reading tasks of the middle grades. (Italics added.)

Those of us who ask what can be done to help produce more thoughtful, critical readers need to work out for ourselves a rational appreciation of the role of language in the biology of humans. We must acquire for ourselves a consistent theory of why humans have language as well as how it came to be. We must come to terms with the linguistic and cognitive dimensions literacy adds to human behavior. When all of these are realized, we will know what to do to produce more thoughtful, critical readers.

This paper addresses these issues with perspectives on the roles of perception, automaticity in the application of linguistic and cognitive skills, and the enhancement that literacy brings to these skills. In order for the readers of this paper to know from where the writer is looking with respect to human nature and the origin of language, statements on these topics are provided. In the critical evaluation of models that depict the reading process, these ideas will be points of reference. Reading models are presented under the current descriptive terminologies used to categorize them: bottom-up, top-down and interactive. These models will be examined to show why they lack the power to direct the development of reading skills necessary to achieve comprehension beyond level 2 in the model:

1. Initial comprehension, leading to
2. Preliminary interpretations, followed by
3. A reexamination of the text in light of these interpretations, leading to
4. Extended and documented interpretation.

Human Nature

The view of humanity that most prevents the human species from understanding itself is that of dualism--humans have two natures, physical and spiritual. This view is pervasive in both occidental and oriental cultures. Adherents of dualism believe that educational institutions should develop and follow curricula that cause biological influences to wane and the spiritual and intellectual possibilities to wax. The waxing of the spiritual potential pulls the individual further and further away from his state at birth. Eventually death gives the final release from the sordid demands and constraints of biology.

Language development is seen as a measure of how far one has advanced from his biological nature into his spiritual potential. Humans are said to self-actualize toward their greater potentiality by using language and experience to weave intelligence, which is the only defense against biology.

For this writer, however, human life is not a mosaic of conflicts between two competing natures. Human life is a unitary function. It is sustained by an organic cooperation among a protoplasmic community of cells, glands and organs. As the brain evolved in the process of coordinating the ever increasing complex and interrelated biological functions, it diversified and became an association of organs within itself. Human life requires the most complex cerebric cooperation among the brainstem, the cerebellum, the thalamus, the limbic system and the cerebrum.

In denying human dualism, we do not claim that spiritual experiences are not possible. They are. Those who have them realize and enjoy the supreme experience being biological permits. When all the senses converge without one of them being dominant, but each contributing the positive amount the evolutionary process has deemed appropriate, the human organism experiences its wholeness or completeness. Spiritual experiences integrate the senses so the human soul may feel just how biological it is. Language may be used in a manner that commands the brain to integrate our senses so we can experience our wholeness.

Rejecting dualism makes it possible to see that moral principles have biological origins. The most fundamental reason for the rise of the nuclear family of a father, mother and children is biological. The most efficient and parsimonious way to propagate the human species is the nuclear family. The moral codes used to guide sexual behavior have a biological origin; they were later adopted by religion. The consistent violation of these codes leads to severe health problems. The universal moral code: "Do to others what you want them to do to you," is fundamental to the survival of the species. Through eons of time biological conditions have generated the moral principles modern religions claim as their own. Biology, on an evolutionary scale, developed religion for humanity. Rituals that have no biological significance are modified until they fade away. That which has biological significance is universal to all religions.

Once it is accepted that each competence a person can acquire is designed to serve a biological purpose, the way literacy is taught will develop in the learner the cognitive skills necessary to command the brain to perform specific skills. It will be recognized that the brain, like any other biological organ, will expend only the amount of energy necessary to meet immediate needs. One of the major purposes of language is to command the brain. The results of a command may not be immediate. The cognitive awareness which rises to a conscious level and is often called "insight" may not have surfaced if at a prior time language had not been used consciously to guide the brain to consider the topic on which the insight provides some elucidation. Only a small percentage of humans experience the "aha" enlightment because only a few use language the way that is required for it to occur.

The Origin of Language

Nothing has intrigued humans more than their linguistic competence. It is the last frontier of human behavior. Since 1628 when William Harvey described the circulatory system, understanding the various systems that generate and sustain life have gradually come to be understood by man. Gregor Johann Mendel in 1866 discovered the genetic laws of heredity. In 1839 Matthias Schleider and Theodor Schwann discovered the cell, the basic unit of life. Charles Darwin's (1925) theory of evolution gave to all interested scholars a biological scale of evolutional creation that unlocked time so humanity could understand the origin and diversification of life.

Nothing has eluded the grasp of our cognitive reach more than the origin of language. Jespersen (1959), Pie (1965) and Stam (1976) review both ancient and modern theories on the origins of language. Among the ancients Pythagoras, Plato and the Stoics held that language evolved out of an "inherent necessity" while Democritus, Aristotle and the Epicureans believed its origin was in human convention. Rousseau suggested that it was convention, too, while Herber revived the idea of the origin being a necessity from innermost nature.

Stam (1976, p. 237) cites August Schleicher as a nineteenth century linguist who at first accepted the conventional view of the origin of language and later rejected it in favor of the "inherent necessity" theory. Stam writes: ". . .Schleicher openly retracted his earlier assertion that language belongs to the spiritual side of man, because language has a history. Rather, language merely shows a becoming . .

. , like all natural phenomena. and that is history in any accurate sense; hence language belongs to the 'unfree and natural side of man.'"

During the eighteenth and nineteenth centuries several profound insights about language emerged; but none of them lead to the understanding of the origin of language. Friedrich von Schlegel proposed that the linguistic diversities among speech communities were evidence of arising of many different languages; no one proto-language was the "parent" of all languages (Jespersen, 1959, p. 35). Even today Wilhelm von Humboldt's ideas about language are heard. He saw language as continued activity, not discrete units. The breaking up of language into various units produces a dead product. Nothing in language is static; everything is dynamic. It cannot abide ever in writing. In writing it is dead but can be recreated by a human brain. For Humboldt, no language should be condemned or depreciated, not even that of the most primitive tribe. Every language is sophisticated enough to meet any communicational need its speakers have (Jespersen, 1959).

Bopp (Jespersen, 1959) saw languages as natural organic bodies which are formed according to fixed laws. They develop as if they possessed an inner principle of life; they gradually die because they do not understand themselves any longer. It is impossible to determine how long a language will retain its vigor and be open to its speakers' creative powers. Rapp (Stam, 1976, p. 231) also saw language as a natural product. For him, "Language. . .is a natural product, for it is not brought about by the will or any individual nor by human reflection; rather the human spirit organized the linguistic substance unconsciously. As such, the regularity of language is as external and as material as the regularity of external nature." Hovelacque (Stam, 1976, p. 231) wrote, "For in point of fact languages are born, grow, decay, and perish like all other living things. . . ." Darwin (1952, pp. 300-301) saw in languages organic qualities. He wrote:

> Languages, like organic beings, can be classed in groups under groups; and they can be classed either naturally according to descent, or artifically by other characters. Dominant languages and dialects spread widely, and lead to the gradual extinction of other tongues. A language, like a species, when once extinct, never,. . ., reappears. The same language never has two birthplaces. Distinct languages may be crossed or blended together. We see variability in every tongue, and new words are continually cropping up; but as there is a limit to the powers of the memory, single words, like whole languages, gradually become extinct. As Max Muller has well remarked: 'A struggle for life is constantly going on amongst the words and grammatical forms in each language. The better, the shorter, the easier forms are constantly gaining the upper hand, and they owe their success to their own inherent virtue. . . . The survival or preservation of certain favoured words in the struggle for existence is natural selection.

> The perfectly regular and wonderfully complex construction of the languges of many barbarous nations has often been advanced as a proof, either of the divine origin of these languages, or of the high art and former civilization of their founders. Thus F. von Schlegel writes: 'In those languages which appear to be at the lowest grade of intellectual culture, we frequently observe a very high and elaborate degree of art in their grammatical structure. . . so with languages; the most symmetrical and complex ought not to be ranked above irregular, abbreviated, and bastardised languages, which have borrowed expressive words and useful forms of construction from various conquering, conquered, or immigrant races.' From these few and imperfect remarks I conclude that the extremely complex and regular construction of many barbarous languages, is no proof that they owe their origin to a special act of creation. Nor, as we have seen, does the faculty of articulate speech in itself offer any insuperable objection to the belief that man has been developed from some lower form.

Grimm, of fairy tale fame, rejected the possibility of language having been either created by God as a part of the creation of humans or revealed to them at a later date (Jespersen, 1959). Its imperfection and mutability belie a divine origin. Language had to be developed gradually by humans and should not be compared to the immutable and instinctive cries of animals.

Linguists have been most imaginative in their explanations of the origins of language. Pei (1965, pp. 21-22) reviewed six of the picturesque names linguists have given the originating process of language. The "bow-wow" theory held that language is a result of imitating the sounds of animals. The "ding-dong" name suggested a correlation between sounds and speech. The "pooh-pooh" description posited the origin of language in the human tones of surprise, fear, pleasure, pain, etc. The "yo-he-ho" saw language arising out of the grunts of physical exertion. The "sing-song" version depicted language as being an extension of primitive inarticulate sounds. And, the "ta-ta" theory stated the roots of language may be found in the bodily movements which were imitated by the human voice.

Such theories on the origins of language eventually wearied linguists to the point that this topic became no longer considered proper for scholarly discussion. Swadesh (1971, pp. 4-5) wrote, "Even before the end of the nineteenth century,. . ., and definitely in the first half of the twentieth, scholars . . . had developed an attitude of weariness or impatience toward all theories concerning the beginning of language." In 1865 the Linguistic Society of Paris was founded and had as one of its bylaws the following:

> The Society will accept no communication dealing with either the origin of language or the creation of a universal language. (Stam, 1976, p. 255)

In 1973, Alexander J. Ellis, President of the Philological Society of London, reviewed Muller's lectures on Darwinism and concluded:

> I conceive such questions to be out of field of philology proper. We have to investigate what is, we have to discover, if possible, the invariable unconditional relations under which language as we observe it, forms, develops, changes, or at least to construct an empirical statement of definite linguistic relations, as ascertain how far that statement obtains in individual cases. Real language, the go-between of man and man, is a totally different organism from philosophical language, the misty ill-understood exponent of sharp metaphysical distinctions. Our work is with the former. We shall do more by tracing the historical growth of one single workaday tongue, than by filling wastepaper baskets with reams of paper covered with speculations on the origins of all tongues. (Stam, 1976, pp. 255-256)

Stam also cited (p. 258) a summary by Eduard Meyer, German author of History of Antiquity, on the futility in the search for the origins of language. The succinct summary is:

> The notion,. . ., that the investigation of the historical development of a language family could provide a historical look at the origin and beginning stages of language, has long since proved to be an illusion. . . . Language as such, that is, the insoluble connection of a group of sounds with a specific meaning, is an absolute given for linguistic science, whose origination cannot be explained with the means at hand.

Both E. B. Tylor (1878), an anthropologist, and Wilhelm Wundt

(1900), founder of modern psychology, commented on the origins of language. Stam (p. 260) cited Tylor as having written that "The idea that gesture language represents a distinct separate stage of human utterance, through which man passed before he came to speak, has no support from facts. But it may be plausibly maintained. . . ." We know so little about the Origin of Language that even the greatest philologists are forced either to avoid the subject altogether, or to turn themselves into metaphysicians in order to discuss it. Wundt believed "The problem of the origin of language,. . ., can only be pursued to the extent that one restricts it to the question how the expressive movements peculiar to man and adequate to his level of consciousness became linguistic sounds and thence gradually the symbols of mental contents. . . ."

With the rise of Watson's (1924, 1958) behavioristic psychology during the first quarter of the twentieth century, the quest to understand the origin of language fell into a hiatus of hostile neglect. It was not until Chomsky (1959) wrote a review of Skinner's (1957) Verbal Behavior that it began to become acceptable to speculate again on the origins of language. Englefield (1977, p. 154) has given this assessment of the reaction to Chomsky's ideas: "The popularity of Chomsky's views seems to be due to the fact that they are accepted as the only reasonable alternative to behaviorism. . . ."

Oleron (1977, pp. 48-65) has given a synopsis of the influence behaviorism and verbal mediation have had on the study of language.

Watson stressed the relationship between language and thought. He saw language as an intermediary which could extend the behavioral perspective to thought. Language is connected with intellectual activities; it is clearly an activity comparable to the practical or effective bodily activity. For Watson, the connections between language and thought are ontological: language is thought. Language is the means for perception and memory.

Viewing language as the means for perception and memory eventually leads to Benjamin Lee Whorf (1956), a student of the Anthropologist, Edward Sapir, restating the following two hypotheses (Dale, 1976, p. 238):

1. All higher levels of thinking are dependent on language. This is linguistic determinism: that is, language determines thought.
2. Languages differ drastically; therefore the world is experienced differently by speakers of different languages. This is linguistic relationism: the picture of the universe is different for individuals in different linguistic communities.

The philosophical foundation for Watson's behaviorism originated with John Locke (1952) in the seventeenth century. Locke theorized that the human brain was a tabula rasa or a blank tablet at birth; this implied that humans are born free of hereditary influences with reference to intellectual development. Berkeley's (1952) treatise, first published in 1710, Principles of Human Knowledge, helped to perpetuate the tabula rasa concept of the brain. Watson based a school of psychology upon it, even though it had not been verified.

Watson was so sure that a human's intellectual potential was so malleable at birth that he boasted (1962):

> Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in, and I'll guarantee to take any one at random and train him to become any type of specialist I might select--doctor, lawyer, artist, merchant, chief, and yes, even beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. I am going beyond my facts and I admit it, but so have the advocates of the contrary, and they have been doing it for many thousands of years.

Skinner's (1971, 1972) two books: Walden Two and Beyond Freedom and Dignity are based upon the tabula rasa. It is a romantic view of human potential accepted by some religious groups in the nineteenth century and by Karl Marx. Given the right circumstances, humans can be programmed to be perfect citizens; yes, even perfect readers.

Behaviorism is holistic in the sense that any organism is seen as functioning as a whole. Watson assumed that humans think with their entire bodies. Dualism is as unacceptable for a behaviorist as it is for us, but for different reasons.

Both Watson and Luria, a current Russian psycholinguist, attribute to language the role of setting the organism into action as well as causing actions to be modified. Watson associated the acquisition of language with the maturation of motoric and visceral response systems. Before language can play a role in determining behavior, the child must have the physical maturation necessary to respond to the linguistic commands. Progressively, language evolves until it ultimately becomes dominant, according to Watson, since man solves these problems verbally.

American behaviorists have developed many of the basic concepts Watson presented. Verbal mediation has been studied and developed by such psychologists as Osgood (1953), and Dollard and Miller (1950). Two characteristics of verbal mediation are: (1) It attempts to represent facts in an apparently simple and yet conceptually rigorous way; (2) It permits the coherent conceptualization of all behaviors whether or not language is involved. Osgood, using the Hullian (1930) concept of pure stimulus acts or responses which are pure stimuli, proposed that organisms may perform because they anticipate reward. Hull interpreted this behavior as a chain of stimuli and responses occurring within the organism. This chain takes the place of the response chain set into motion by a succession of external stimuli. In this way, anticipation can occur. Once set into motion, the internal chain can occur more rapidly than the actual events; therefore, the organism has a means of foreseeing the end of the series. Even if this Hullian description does not involve language, since his model explained only animal behavior, he (Hull) assumed that this description could involve language; language could be treated in the same way as internal responses which are integated into the overall response pattern. Language helps form representations of the future which is anticipation based upon knowledge; it is not susceptible to reduction within a stimulus-response framework in which the consequences, responses, depend deterministically upon antecedents, stimuli.

Dollard and Miller present analogous views in the frame work of "response-producing indices" and "indices produced by responses" rather than pure stimuli acts. An "index" is equivalent to a stimulus, but not in terms of inciting potential. Response-producing indices are involved in such high level activities as thought and reasoning. Language is both a repertory of such indices and the practice of using them.

The concept of mediation is more specific than verbal mediation. Mediational theory characterizes child development in terms of the increasing role played by intervening mediators in an individual's repertoire of experiences. In the beginning, a human responds solely in terms of instinct or learned stimulus-response schemata. Slowly, mediators become involved.

In the initial phase of development of the concept of mediation, language was not included. Both Watson and Hull discussed nonverbal features of mediation. In more recent discussions of mediation Bruner (1964), Flavell (1964) and Paivio (1971) have used this concept without direct verbal association. Flavell, who has suggested that the action represented by thinking could replace the concept of mediation, would include actions and fantasized images under mediation. Bruner's "enactive" and "iconic" modalities may be forms of mediation. Paivio would include mental images in this psychological function.

Mediation has assumed additional connotations as behaviorists have worked with the concept. Originally it was formed within a stimulus-response framework. Psychologists of other schools of thought have incorporated the idea of mediation into their conceptual schemata. Mediational theory helps us to understand Piaget's (1952, 1954, 1969) functional ideas of accommodation and assimilation as well as how a new cognitive equilibrium is established after experience has created a disequilibrium. Piaget was a behaviorist, but not in the sense of the American stimulus-response or operant-behavior paradigms. He emphasized both internal and external factors in behavior; he gave attention to the various cognitive maturational levels a human organism must have to respond in specific ways to external stimuli. Where Watson stressed the need for the development of motoric and visceral response systems before language could be acquired and applied, Piaget emphasized that language could not cause cognitive development. Both Watson and Piaget believed that intelligence developed as a result of holistic responses to stimuli.

Neither stimulus-response nor operant models nor Piaget's schemata adequately explain language's role in determining behavior. For this reason Chomsky's review of Skinner's (1957) Verbal Behavior set off a revolution among scholars concerned with language. Since it is more difficult to be thoroughly wrong than completely correct for scholars pursuing knowledge in a specific area, it would be unwise to reject in total all the ideas associated with behaviorism. This would be a repetition of the type of rejection that occurred when it was decided that the origins of language were not worthy of scientific pursuit.

Since the Chomskyan revolt against Watson's behaviorism began in the later part of the 1950's, a number of theories on the origins of language have surfaced. Perhaps the most esoteric one to emerge is that suggested by Gans (1981). Gans, using Rene Girard's (1981) hypothesis as a starting point, posited ritual as being the source of language. He (1981, p. 30) wrote, ". . . (Ritual) is deemed the source of language at the same time as language is being used to explain ritual." Gans arrived at this conclusion via Girard's hypothesis which he, Gans (pp. 11-12) outlined as follows:

1. Emergence of a quantitative difference. All higher animals have a tendency to imitate the gestures of their own (and sometimes other) species. Early man, as a result of various factors, acquired greater gifts for and inclination toward such imitation than any other species.
2. Transcendence of nonsignificant ("Animal") mechanisms for maintaining the collectivity. The imitation of appropriative behavior leads to potential rivalry among

members of the same group, which among animals is controlled by the mechanism of stable dominance relationships. This mechanism functions in the absence of any "event," i.e., of any occasion in which the entire group is present to itself, through dual relations of dominance and submission. Beyond a certain threshold of mimetism . . . this mechanism can no longer function: Disagreements over specific objects lead to mimetic conflict between rivals in which the object is forgotten and which spreads beyond the dual relation to contaminate other members of the group.

3. The event: Choice of an "emissary" victim. The crisis produced by mimetic rivalry will tend to polarize the violence of the group as a whole against an individual arbitrarily designated as the cause of the crisis. The victim will presumably be a marginal figure--diseased, crippled, of strange appearance or origin--apt to arouse the suspicions of the group. With the collective murder of this victim the group discharges its aggression and at the same time creates the conditions for the coincidental emergence of the sacred and of representation.
4. The victim's body as the first signifier of the sacred. This discharge of aggressive energy, the sudden passage from paroxystic violence to quietude, leaves the

murdered victim the object of the "first non-instinctive attention" of the group as a whole. Because the victim appears to the group as both the cause of the crisis and the source of its resolution, he signifies to the community the totality of the process, and thereby the significant-in-general.

5. The reproduction of the sign. Because the appearance and murder of the victim not only resolve a specific crisis but produce a communal peace not otherwise accessible, the group will tend to reproduce the original event by the murder of new victims now designated in advance. Thus ritual sacrifice arises as a re-presentation of the original event. It is in this context as well that Girard situates his brief remarks on the origin of language, which he sees as emerging from ritual reproduction of the cries accompanying the crisis and murder.

Even though the origin of language is in sacred ritual, its evolution depends on distancing its referents from the domain of the sacred (Gans, 1981, p. 67). Where Girard and Gans viewed language emerging out of ritual cries Swadesh (1971) saw it coming out of animal cries. Swadesh (p. 167) recommended, ". . . if we want to comprehend how present-day human language came to be, we are well advised to consider animal communicative behavior with as much understanding as we can muster." Swadesh believed specific phonemes symbolize the action that produced it and the shape and make up of the object or objects involved. The following form a hypothetical manual of sound imitation proposed by Swadesh (p. 208).

1. Stops represent hard impact, nasals soft impact or resonant vibration, continuants free vibration.
2. Vowels indicate shape, presumably in accordance with the kind of vibration that goes with each form of resonance space.
3. Labials (p, m) give the effect of flat surfaces slapping together, dentals (t, n) the contact of point, velars (k, ng) that of blunt objects, labio-velars (kp, ngm) hollow or cupped contact, sibilant (ch) liquid or sliding contact.
4. The two consonants of a vocable permit the definition of a complex sound, from first contact to final fading, the shape of each of two colliding objects or a three-dimensional shape defined by its form at each end.

Swadesh gave some concession to gesture in the development of human communication. He (p. 162) conceded, "Man is normally both a speaker and a gesturer." Many gestures seem to be instinctive as well as spontaneous; they also contain a large element of conventionality, sufficient to puzzle people in cross-cultural communication. However, gesture language is more universal than formal speech (p.164).

Hewes (1973), after studying the language studies of Gardner and Gardner (1971, 1969) and Premack (1971), concluded that language has a gestural origin. He chose gesture out of the twelve major theories on the origin of language. Lock (1978) also is inclined toward the gestural theory with some input from vocal signals.

For a provocative presentation on the role of action, gesture and symbol in the emergence of language see Lock (1978). This book, Action, Gesture and Symbol: The Emergence of Language, is a compilation of articles on such topics as the roles of biology, dialogue, culture, caretaker-infant interaction, intersubjectivity, action/gesture, sensori-motor intelligence, social relations and the child as a psychologist in the development of language for the human species and the acquisition of language by the individual. This compendium of scholarly thought tends to favor gesture as the prime source that initiated and guided the development of language.

Urwin's (1978) study of language acquisition by blind infants bears significantly on gestural theories for the development of language in the human species. Urwin (p. 108) reminded us that, "In learning particular arbitrary symbols to refer to 'named things and events' the child acquires language relevant to the life-world in which he is growing up. This must also apply to the uses he finds for speaking itself." With this in mind Urwin (p.81) stated the following synthesis of her research findings acquired from studying blind infants' acquisition of language.

> Many of these language difficulties are most marked in the early stages. . . . This implies that essential conditions for the emergence of linguistic communication as a generative system may not have been fulfilled. Constraints on the development of active exploration may result in delays in cognitive functioning responsible for some of the language problems. But cognitive development alone does not explain language development. The implications of the babies' blindness for the development of social interaction in the preverbal period may also be related to their difficulties in acquiring language.

Urwin, in enumerating difficulties that blind infants experience that affect language acquisition, cited her research as well as that of others. Bower (1974) and Fraiberg (1968) reported that reaching for objects is a more difficult task for blind infants since they must depend upon sound cues only. Reaching for objects on sound cue alone does not emerge before 8-9 months. Delay in mobility for blind babies restricts semantic acquisition.

Burlingham (1961) found that language is of most importance for providing contact with parents as well as others. The blind child is more isolated socially and cognitively than is the sighted infant. There is an apparent universal delay in blind children's use of the I-You pronoun distinction as reported by Adelon and Fraiberg (1973).

Burlingham (1961) and Wood (1970) found that most blind children are comparatively late in acquiring nominals, and use them reluctantly in communication. Nelson (1973) found sighted children vary in the kinds of words which dominate their early vocabularies. Wood (1970) reported that blind children have a propensity to imitate, and extreme cases of echolalia are not uncommon. The general conclusion for blind children with no additional neurological damage, is that their speech is initially delayed and restricted to their own body movement or familiar routines.

To gain a better understanding of the role of gesture in language development, Feldman, et al. (1978) studied the use of gestures in deaf children. They found (p. 355) that deaf children "begin to use manual gestures of their own to reveal their thoughts and wishes to others." The six children studied ranged from age 1 year 5 months to 4 years 1 month. They resided in the Philadelphia area; in this community school authorities instruct parents of deaf children not to gesture to them formally or informally, lest this interfere with the motivation for acquiring spoken English.

Feldman and his colleagues believe (p. 356) that they "have suggestive evidence that these uninstructed novices, while severely limited in means, do have the internal wherewithal to develop a passable communication system" based upon the use of gestures. They observed from a perspective of comparing the use of gestures in hearing and deaf children that (p. 375) "gesturing tends to decline for hearing children as speech emerges" while it increases for the deaf subjects.

In summarizing their findings Feldman and his associates contrasted the import of their study to that of Newport et al. (1977). Newport and the Gleitmans looked at the mother's speech style at stage one and the child's linguistic developmental rate between time one and time two. The result was that language-universal aspects of child language were insensitive to the observed differences in maternal speech style; but language-specific aspects of inflectional morphology were sensitive to differences in maternal speech style, which is to say, the child pays more attention to ends of words than to words in general. Brown (1973) has suggested that children may be predisposed to pay attention to ends of words. Newport and his associates looked at the influence of the "outside-in" information children make use of in acquiring language while Feldman and his colleagues looked at the "inside-out" evidence that shows what they bring to the task of learning a language. Taken together, the two studies help to disentangle two kind of factors in language learning: those that are direct consequences of the input and those that seem to come from inside the child.

The child obtains most of his "outside-in" information from dialogue with a caretaker. Clark (1978, p. 257) presented the following sequence of events that lead from action to speech communication. First, action leads to (2) gesture implying action, leading to (3) arbitrary sounds that imply gestures that in turn evoke action. When competence to use artibrary sounds is achieved, dialogue is possible. Gray (1978) discussed how a child's learning to take an object from the mother leads to dialogue. These interactions developmentally increase in complexity and are dependent on the mother's action and on her attending to and interpreting the child's actions. The interaction is cumulative as the mother sensitively teaches her child about objects. She responds to his emotions and treats him as a human being which leads to a dyadic interaction.

Trevarthen and Hubley (1978, p. 213) believe "dyadic interpersonal function is evidently changed as infants develop effective prehension and an increased facility for observing events and the useful properties of objects." They "conceptualize this development to be by differentiation of a fundamentally coherent field of intentionality which is, . . ., already anatomically partitioned at birth into three modes out of which three kinds of experience and action are generated postnatally." They propose that these three modes are real systems in the brain that achieve functional identity by the individual interacting with others and with phenomena in the environment. The actions and perceptual processing essential for (1) knowing and using objects (praxic mode), for (2) communicating with humans (linguistic mode), and for (3) acting in self-directed or thoughtful manner (reflective mode) are innate brain structures that are rudimentary at birth. The language mode may undergo the greatest elaboration during the second and third months of infancy. Then it becomes adjusted to developments in the other two modes, especially the praxic.

Before going into a detailed discussion of views on the human biological predisposition to acquire language, the artful description of language development by Englefield (1977) is given. The following excerpt is a synthesis of Englefield's (pp. 93-94) view on the origin of language.

> An oral language must consist for the most part of arbitrary sounds. A few of these may have resulted from the abridgement of natural or imitative sounds, but such a process could not have produced the enormous number of words found in every known language. At some point deliberate invention must have occurred; yet this is conceivable only when man had already come to see how arbitrary sounds can be made effective for communication. This they might have learnt from their experience with arbitrary gestures. But since the building up of a language by the invention of words must be a slow process, the real advantages of such a language would not readily appear, and the motive for persevering in such an enterprise would seem to be lacking. We have therefore to look for some other motive which could encourage the use of vocal signs instead of gestures at a time when a language composed exclusively of sound was still out of the question. This motive, . . ., might be found in the use of conventional sounds for the sake of secrecy. In restricted groups of men a small number of such sounds could be used, not as a complete language for all purposes, but as a private supplement to the normal language of gesture. There is no reason why such vocal signs should not form part of the normal mode of communication among all the members of the

> community. But the more such speech forms were multiplied, the more restricted would be their use, and it seems likely that only in small and intimate circles with special private interests would the necessary incentive be found for the deliberate construction of a real language of sounds. But once such a language had come into existence it might be learnt by an ever increasing number of young people, and in course of time it would be degraded into the common language, a new one being invented, if required, for secret communication.

The Chomskyan revolution led to speculation on how biology prepared the human species to acquire language. Chomsky (1972, 1962) and McNeill (1970) have proposed that humans are born with an innate language acquisition device. McNeill has used this concept to portray a young child as being a clever little linguist constantly on the alert to understand adult language. He credited the child for having far more syntactic competence than his performance demonstrated.

Commenting on the child as psychologist Shields (1978, p. 533) countered, "The recent controversies about the hypothesis of an innate language acquisition device are a warning against attributing too much of the skill acquired interactionally to a genetic base." Shields (p. 532) approvingly referred to the scholarly situation of instinct-based egocentrism and cognitive egocentrism being under fire. He wrote (p. 532): "The theory that the young child is dominated by organismic drives has now begun to cede before a more ecological model of constant interaction between the child and his environment, above all his social environment." He concluded (p. 556) ". . . (It) is time that the cognitive psychologist came face to face with the young naive psychologist, and turned his sophisticated techniques to building a more adequate model of the growth of man's concept of man."

The concept that biology predisposed humans to acquire language received strong support from Lenneberg (1975, 1967, 1964) and Lieberman (1975). These two scholars have brought a biological perspective to the study of the origins of language. Like Vygotsky (1962) Lenneberg (1967) suggested that language and intelligence have different genetic roots. With this thought in mind, it is appropriate to recall what Ferruccio Rossi-Landi (1977) has written about the interrelationship between language and thought. He wrote:

> The categories of language and thought, of speaking and writing, and all similar categories, overlap to a great extent, that neither term of any such pair can be properly understood without resorting to the other. Distinguishing various aspects of language from various aspects of thought is an intricate business which itself requires continuous references to both.

Swadesh (1971, p. 180) wrote, "Increased effectiveness of communication was aided by and in turn aided the general development of intelligence. The approach to and the entrance into the stage of formal systems of communication was an inevitable consequence of the growth of intelligence in a species that had already achieved an advanced use of intuitive forms of symbolic interaction." This is in accord with Vygotsky's (1962) view of the relationship between language and intelligence. Englefield (1977) also referred to the relationship between these two. In reference to Plato's and other philosophers' views on the topic of whether thinking was essentially a process of talking to oneself Englefield (p. 137) wrote: ". . . I think, that words do in fact play an important part in thought, especially abstract thought. Words serve a real function in the reflective process--not as a logical mechanism, but as mnemonics and as summaries." Earlier in his book on the topic of the number of distinct words for a language he observed (p. 114), "If we had a word for every thought or every combination of ideas that we needed to express, then we should never need to use more than one word at a time, and we should ever be at a loss, as long as our memory served us. But in real life we have no comprehensive words like this and have to make up sentences, *and the main business of language consists in just this putting together of words into new combinations to express our thoughts*" (italics added).

However convincing Englefield sounds in the above statement, it becomes less clear when one reads his comment on the behavior of Kohler's ape, Sultan. Sultan used a box to stand on in order to reach some fruit. Englefield (p. 3) put it this way:

> He (Sultan) obviously saw, in his mind's eye, the fruit, the box and himself moving the box to under the fruit. We can explain his

> behavior by supposing that he was able to carry in his mind an idea, or inner representation of the primary goal, and of himself achieving that goal with the aid of the secondary goal. In other words, he carried out, in imagination, a maniputation which he then proceeded to carry out in fact. It is in this power to form ideas and to manipulate them internally that we see the basis of human thoughts and human inventions. Thinking consists essentially of performing such experiments in the mind. It consists in doing in the imagination what one has learnt to do with one's body. I can think of taking a walk with the dog because I have performed the actual operation. *I do not need any words*. A man used to working with his hands, to making things or manipulating them, will think in terms of such practical behavior. The fact that Kohler's apes can do this too shows that, here again, *words are not essential* (italics added).

Englefield's physical description of the use of the body to establish cognitive schemata resembles ideas that Piaget and Watson have expressed. The involvement of the total body is not a part of the recent genetic theories developed to explain the human predisposition to acquire language. These theories stress only the innate characteristics of the human brain. Lenneberg stressed how these characteristics cause language to be specific to the human species. He also outlined what he referred to as critical periods in the acquisition of language. The stages Lenneberg scaled are related to the maturation of the central nervous system and the degree of equipotentality in the hemispheres of the cerebral cortex to acquire language competence.

As for intellectual ability, Lenneberg stressed that language acquisition is possible over a wide range of intelligence, down to IQ levels of about 50; bright, average, and less intelligent children learn to talk. Children vary greatly in their talkativeness, in vocabulary, and in what they have to say; but mastery of the basics in a linguistic system does not vary greatly. The variation that does occur is far less than that in the mastery of arithmetic, which is less complex than language.

In praise of Lenneberg's work Lieberman (1975, P. 122) wrote, "Lenneberg (1967) presents a coherent review of much of the literature and makes a convincing argument for the presence of particular, specialized neural structures that are necessary factors for human language." Lieberman went on to explain ". . . these studies, in isolation, cannot yield any definitive answers because we simply lack a detailed knowledge of how the human brain functions." In detail Lieberman (p. 170) wrote:

> The neural structures of the brain that play so crucial a role in the perception of encoded speech in the dominant, left hemisphere of the brain . . . may not have been as well developed in Neanderthal man. This is, . . ., consistent with the view of Edinger (1948) and Washburn (1968) that 'the majority of the unique

features of the human brain evolved long after the fundamental patterns of the human way of life. . . . The brain follows in evolution.' (Washburn, 1968, p. 37)

On the origins of language Lieberman (p. 158) speculated, "The first hominid 'language' probably evolved from communication systems that resembled those of present-day apes. . . . The initial language of the australopithecines. . .may have had a phonetic level that relied on both gestural and vocal components (p. 159). . . . The final crucial stage in the evolution of human language would appear to have been the development of the 'bent two-tube' supralaryngeal vocal tract of modern man (p. 159). . . . Later stages in the evolution of human language probably involved the retention of mutations that had innately determined the neural mechanisms 'tuned' to . . . new sounds (p. 160). . . . (By) innately determined we do not mean to imply that the organism needs no interaction with the environment to 'learn' to perceive these sounds. The evidence instead suggests that humans are innately predisposed to 'learn' to respond to the sounds of speech" (p. 161).

Lieberman proposed that evolution preserved the cognitive and physical traits humans acquired in the process of developing language. This may be the ultimate twist in the Whorfian (1956) hypotheses which states (Dale, 1976, p. 238):

1. All higher levels of thinking are dependent on language. This is linguistic determinism: That is, language determines thought.

2. Languages differ drastically; therefore the world is experienced differently by speakers of different languages. This is linguistic relativism: The picture of the universe is different for individuals in different linguistic communities.

It is the ultimate twist to assume that the proto-languages guided the development of the cognitive capacities to perceive. And, if the brain follows rather than leads evolution, then it is reasonable to assume that proto-languages helped to guide the cognitive developments that are responsible for both perceptual capabilities and constraints.

If a proto-language or languages guided the evolution of the cognitive abilities to perceive, then the Whorfian hypotheses of linguistic determinism and relativism have portent only if there were more than one proto-language. Back in 1808, Friedrich von Schlegel suggested that the linguistic diversity among human speech communities pointed to different languages emerging in the beginning of speech. Swadesh (1971) and Bickerton (1981) are not convinced that there is more than one proto-language. Swadesh made (p. 215) this conclusion: "There is no special reason,. . ., to suppose that there was any marked amount of language divergence until a half a million or so years ago. . . . (If) we go back to the days when prehuman communication was not really language, there could only be one system common to our evolving species, albeit with minor individual and subspecies differences. . . . (Formal) language must have developed very slowly, and there was time for innovations to spread from one horde to the next. There would then be a graduated divergence in the dialectical pattern. . . . Individuals of two early hordes would certainly still have had much in common in their speech, not only in the relatively large instinctive-intuitive part of the system, but also in the fact that most of the arbitrary associations must have been very natural outgrowths, built upon the intuitive base in such a way that each could still sense the other's meaning."

In defense of God, Grimm (Jespersen, 1959, p. 61) argued "Against the possibility of language having been either created by God when He created man or having been revealed by God to man after his creation. . . . The very imperfections and changeability of language speak against its divine origin." Both Swadesh (p. 214) and Bickerton (pp. 289-90) would not rule out the Biblical Tower of Babel account of linguistic diversification.

Swadesh believed that "only when a fairly definite and sizable degree of conventionalization had come about was it possible for different languages to exist." He saw the Tower of Babel account as a demarcation between the simple human life for which a universal language served all and the more complex life when wisdom was acquired and desires developed; these generated linguistic variations out of which different, mutually unintelligible forms of speech emerged.

Bickerton sees in the Tower of Babel story a resemblance to his bioprogram theory of the origin of language. Bickerton believes that language has to be a divine gift because no conscious or deliberate human action could have invented it. He has proposed that God chose to use the evolutionary process to bioprogram humans for language. Through a bioprogram, according to Bickerton, only one language could emerge. Language diversified coincidentally with a sudden surge of technological capacity, symbolized by the reaction of the Tower of Babel.

Bickerton's bioprogrammatic, interactive theory has much in common with the Chomskyan concept of an innate language acquisition device. In addition to McNeill's (1970) view that a child is constantly on the alert to understand adult language, Bickerton (p. 134) proposed that ". . . instead of merely processing linguistic input, the child will seek to actualize the blueprint for language with which his bioprogram provides him." In distinguishing his theory from earlier theories of linguistic innateness Bickerton (pp. 134-135) explained:

> . . . the child is not supposed to 'know' the bioprogram language from birth--whatever that might mean--any more than we would suppose that a child at birth, or even at six months 'knows' how to walk. Rather, the bioprogram language would unfold, just as a physical bioprogram unfolds; the language would grow just as the body grows, presenting the appropriate structures at the appropriate times and in the appropriate, pre-programmed sequences . . .there will be a ready-made language which their elders will be determined that they (the children) should learn. Thus, . . .from

the earliest stages the bioprogram will interact with the target language. Sometimes features in the bioprogram will be very similar to features in the target language, in which case we will find extremely rapid, early, and apparently effortless learning. Sometimes the target language will have evolved away from the bioprogram, to a greater or lesser extent, and in these cases we will expect to find common or even systematic 'errors' which, in orthodox learning theory, will be attributed to 'incorrect hypotheses' formed by the child, but which I will claim, are simply the result of the child's ignoring (because he is not ready for it) the data presented by speakers of the target language and following out instead the instruction of his bioprogram.

In response to the most frequent question asked about his theory Bickerton (pp. 290-91) wrote, "If our biological inheritance provides for us a ready made language, . . ., how is it that we ever abandoned that language in favor of the diverse and far more complex language of today?" His response includes: 1) The bioprogram language is self-destructed. 2) It has made possible the construction of cognitive maps more detailed than itself. 3) It has conferred on our species the power to live differently--differently from the past, and differently from one another. 4) Living differently from the past and living differently in various communities created a need for different languages. 5) No biological language could have been designed to suit the needs of all humans under all the different circumstances in which humans could live.

To support his bioprogram competence theory for language acquisition Bickerton studied how a pidgin use of language became a Creole dialect in the second generation of speakers. He saw in the generators of the Creole the cognitive input that he described as being an almost pure demonstration of the bioprogram for language innate in humans. The research Feldman et al. (1978) have conducted on the acquisition of language in deaf children offers some support for the bioprogram theory. Urwin's (1978) research findings on the acquistion of language by blind children may also be interpreted to support the bioprogram theory. For more information on the pidgin/Creole portent for language learning see Labov (1971) and Sankoff and Laberge (1973).

As the Chomskyan revolution abated, the idea of total dominance by innate, neural structures in the acquiring a language decreased. Schlesinger (1982) credited the environment as having more influence than Bickerton proposed. Schlesinger (p. 104) put it this way: ". . . (It) is not either cognitive development or linguistic input that determines linguistic growth but an interaction between these factors." Where Bickerton (p. 240) stressed that "the nature of neurological equipment enables semantic structure to be divided up in a number of possible ways. At the same time, it prohibits semantic structure from being divided in an infinitely greater number of ways, any of which might seem a priori no less logical or possible, and imposes rigid contraints on the sequence in which any given analysis of the semantic structure can be rendered more complex." Schlesinger (p. 146) wrote, "The texture of our perceptual world constrains but does not fully determine the concepts resulting from cognitive and linguistic interactions. Texture suggests concepts; it does not create them . . . Texture and linguistic input must converge on the formation of a conceptual system."

Schlesinger (p. 146) sees universal texture as being responsible for the similarities between languages "which, at least at the basic object level, outweighs the difference between them . . . That there are also differences is due to the fact that,. . ., texture does not completely determine categorization. . . . (The) fact that the perceived world is not textureless and random explains why children do not go on searching blindly for the meaning of a word. On the contrary, a child acquires words,. . ., rapidly and easily, and with most words his performance is errorless from the beginning. . . . Without the guidance of texture his progress would be much more laborious, and communication with adults would at first be excruciatingly difficult."

Richards (1978) came forth to assure us (p. 25) that ". . . biological endowment does not determine outcomes--it provides means and not ends." Richards (p. 25) acknowledged ". . . clearly the infant must play a major role in structuring and organizing his own environment and learning particular things about it and he is endowed with a biological nature that makes this possible." However, (p. 25) "human development would not be possible without a social world."

Richards is concerned about how interaction is used to describe the relationship between the biological and social components of human life. In the variants of interactionism Richards (pp. 27-28) sees these difficulties:

a. The nature of the interactive process is almost always left vague and unspecified. . .

b. Often the elements that are said to be involved in an interactive process are of such diverse conceptual kinds that they could never meet. . .

c. The implicit (or explicit) assumption of most interactionist formulations is that there are biological given, or starting, points which are acted on by social and psychological conditions.

Richards argued that these formulations do not give equal status to the two terms of the interaction equation. Biology is accepted as being prior in space and time. He (pp. 28-30) proposed that the conceptual problems of interactionism could be ameliorated and made a more plausible strategy if features of developmental processes like the following were considered.

a. Biology does not have any conceptual priority over social processes.

b. Central to many of the confusions that have been mentioned is the notion that there is an autonomous world of biology. There is no such autonomy for biology.

c. Interaction implies a randomness in a manner that is not characteristic of development. Many developmental processes show a high degree of predictability and resistance to change in varying environments.

Richards (p. 23) warned that the overuse of accounts of animal behavior to elucidate human behavior tends to reduce man to a complex animal-machine and underplay the species-specificity of our own behavior. They ignore the human attributes of language, self-reflection and social communication as discussed by Bernal and Richards (1973). He (p. 23) also cautioned us against "a misconception about the role of genetic differences in the development of individual characteristics." Some have not understood that epigenetic processes specify means and not ends, and that therefore genes do not determine anything. Shields (1978) also warned against attributing too much to genes in his paper on the child as psychologist. He (p. 533) wrote, "The recent controversies about the hypothesis of an innate language acquisition device are a warning against attributing too much to the skill acquired interactionally to a genetic base." He (p. 556) concluded, ". . . it is time that the cognitive psychologist came face to face with the young naive psychologist, and turned his sophisticated techniques to build a more adequate model of the growth of man's concept of man."

A survey of the major concepts on the origin of language would not be complete without a look at the relationship between linguistic and cognitive development. Reference has already been made to Rossi-Landi's (1977, p. 400) suggestion that, "The categories of language and thought, . . ., overlap to a great extent, ..." Swadesh (1971, p. 180) was quoted earlier as having said, "Increased effectiveness of communication was aided by and in turn aided the general development of intelligence." And Englefield's view (1977, p. 114) is that "the main business of language consists in . . . putting together of words into new combinations to express our thoughts." Vygotsky (1962, p. 72) declared, "The history of language clearly shows that complex thinking with all its peculiarities is the very foundation of linguistic development." Commenting on the child's discovery of the purpose of language Vygotsky (p. 43) wrote, ". . . the most important discovery is that at a certain moment at about the age of two the curves of development of thought and speech, . . ., meet and join to initiate a new form of behavior. . . . He (Stern, 1914, p. 108) showed how the will to conquer language follows the first dim realization of the purpose of speech, when the child 'makes the greatest discovery of his life,' that 'each thing has its name.' " Vygotsky (p. 43) gave this description of a child's discovery of the purpose of language:

> This crucial instant, when speech begins to serve intellect, and thoughts begin to be spoken, is indicated by two unmistakable objective symptoms: (1) the child's sudden, active curiosity about words, his question about every new thing, 'what is this?' and (2) the resulting rapid, saccadic increases in his vocabulary.

> Before the turning point, the child does (like some animals) recognize a small number of words which substitute, as in conditioning, for objects, persons, actions, states, or desires. At that age the child knows only the words supplied to him by other people. Now the situation changes: The child feels the need for words and, through his questions, actively tries to learn the signs attached to objects. He seems to have discovered the symbolic function of words. Speech, which in the earlier stage was affective-conative, now enters the intellectual phase. The lines of speech and thought development have met.

Oleron (1977) has written a book on the subject of language and mental development. For Oleron (p. 25) "Language use exemplifies the notion of an extended pathway. It extends the field of communicable knowledge well beyond the limits of an individual's perception. It enables him to go beyond personal experience, to benefit from the society around him, and to gain access to the world of the imagination or the knowledge of specialist." Oleron (p. 27) suggested that language offers cognitive flexibility when he wrote, "Given its lack of precision of definitions, language enables the sciences to go beyond rigorous limits of knowledge imposed at any given moment in time." He (p. 144) concluded ". . . that the link between man's development and the use of articulated language is probably not insignificant . . . . Spoken language may have developed as the optimal way by which man's intellectual and emotional potential could be achieved."

Oleron (pp. 26-27) pointed out some characteristics resulting from the integration of language and development include: 1) Language is not an external element casually adopted by human organisms who might otherwise have chosen to follow independent developmental schemata. 2) The evolution of the human organism involved the development of an instrument required for basic cognitive activity that would make it possible for the brain not only to achieve but also to enhance its potential. Thus, more elaborated cognitive schemata are such only because the brain has incorporated language into its function and development. 3) Verbal languages do not represent relatively pure models as mathematical or logical systems do. Languages are neither detached from their objects nor from the affect and motivation of their speakers. 4) Verbal languages embody the affect, sentiments, and passions of the subject. Words arouse the positive or negative reactions associated with the objects or people to which they refer. Words can arouse nausea, shame, or anger. The resonant play of phonetic elements can be used poetically to suggest images which cannot be inspired by mere objective descriptions. 5) Relationships between languages and referents are ambiguous. Except for an occasional onomatopoeia, phonetic elements do not correspond descriptively to referents. There is no clear correspondence between grammatical forms and the major syntactic categories such as noun, verb, adjective, abverb and structure words. However, they do contribute in the determination of meaning since they help one to create images as well as facilitating classification with references to substance, action, quality and number.

We must return to Vygotsky (1962, pp. 119-153) for elucidation on the relationship between thought and word. Vygotsky's (pp. 120-121) basic thesis is: "that word meanings develop. . . . Word (p. 124) meanings are dynamic rather than static formations. They change as the child develops; they change also with the various ways in which thought functions."

Vygotsky (p. 128) explained, "Behind words, there is the independent grammar of thought, the syntax of word meanings." He put it this way (p. 150):

> Thought, unlike speech, does not consist of separate units. When I wish to communicate the thought that today I saw a barefoot boy in a blue shirt running down the street, I do not see every item separately: the boy, the shirt, its blue color, his running, the absence of shoes. I conceive of all this in one thought, but I put it into separate words. A speaker often takes several minutes to disclose one thought. In his mind the whole thought is present at once, but in speech it has to be developed successively.

Vygotsky (p. 149) reminded us that "every thought creates a connection, fulfills a function, solves a problem. The flow of thought is not accompanied by a simultaneous unfolding of speech. The two processes are not identical, and there is no rigid correspondence between the units of thought and speech." He (p. 125) described the relation of thought to word as being a process that involves a continual movement back and forth from thought to word and from word to thought. In the process the relation of thought to word undergoes changes which Vygotsky suggested was developmental in function. "Thought is not merely expressed in words; it comes into existence through them. Every thought tends to connect something with something else, to establish a relationship between things."

A summary of Vygotsky's (p. 120) elucidation of the relation between thought and word follows.

> The meaning of a word represents such a close amalgam of thought and language that it is hard to tell whether it is a phenomenon of speech or a phenomenon of thought. A word without meaning is an empty sound; meaning, therefore, is a criterion of 'word,' its indispensable component. It would seem, then, that it may be regarded as a phenomenon of speech. But from the point of view of psychology, the meaning of every word is a generalization or a concept. And since generalizations and concepts are undeniably acts of thought, we may regard meaning as a phenomenon of thinking. It does not follow, however, that meaning formally belongs in two different spheres of psychic life. Word meaning is a phenomenon of thought only in so far as thought is embodied in speech, and of speech only in so far as speech is connected with thought and illumined by it. It is a phenomenon of verbal thought, or meaningful speech--a union of word and thought.

With reference to the acquisition of meaning Braunwald (1978, p. 526) observed:

> . . . (When) the acquisition of meaning is analyzed in a situational context as words emerge and change, one finds factual evidence to suggest that the process is subtle and diffuse. In lieu of substantive answers, one uncovers a complex network of interacting cognitive, social and linguistic processes which indicates that the problem of defining the underlying mental representation of a child's first meaningful words may be incredibly difficult.

Vygotsky (p. 58), sounding much like Piaget, reported that the developmental processes which produce concept formation begins in early infancy; however, the intellectual functions essential for the completion of concept formation are attained only at puberty. Before puberty, intellectual schemata serve or function like genuine concepts yet to be formed. These pseudo concepts appear to have the same composition, structure and operation as that of true concepts. Children must use these pseudo concepts because they have not completed the lengthy developmental process between the earliest and the final stage. Concept formation, which is essential for meaning in depth and breadth, is the result of a complex activity in which all the basic intellectual functions take part. Before this can happen, all that cognitive maturation that comes prior to puberty must occur, according to Vygotsky.

Piaget (1970, 1969, 1962, 1955, 1954, 1952), who has argued that language is dependent upon intelligence, posited four main stages (sensori-motor, pre-operational, concrete operations, formal operations) in the development of cognitive structures. A child usually does not achieve the formal operation stage until he or she reaches eleven to twelve years of age. This is the age of the onset of puberty of which Vygotsky wrote. A child who has entered this cognitive stage can construct new mental operations such as those that require propositional logic; he or she is able to consider all possibilities or combinations rather than those based only on experience or experiment. This child can classify, order, and enumerate in the verbal proposition form of deductive logic. Thoughts no longer need to be tied to existing reality. These are the type of cognitive functions Vygotsky believed are essential for concept formations.

Piaget's first stage of cognitive development, sensori-motor, is of most importance to language acquisition because it includes the first two years of life. Within this stage are six periods.

Period 1 (birth to 0:1) Reflexes are demonstrated that are foundational for future development, e.g., sucking reflex, vocalization.

Period 2 (0:1 to 0:4) Primary circular reactions appear. The infant can focus on its own body, such as thumb sucking. Will vocalize when adults do, and will attend to hear sounds by turning head toward their origins or sources.

Period 3 (0:5 to 0:8) Secondary circular reactions occur. The baby attends to external objects. These reactions hold the child's interest long enough to create learning that makes possible their repetition such as swinging arms to make a rattle function.

Period 4 (0:9 to 0:11) Co-ordination of secondary schemes becomes possible. The infant uses activities learned earlier to achieve specific results such as hitting or moving an older person's hand to move it away from an object he or she wants. The baby will begin to try to imitate novel sounds.

Period 5 (1:0 to 1:4) Cognitive maturation now permits interest in the nature of objects. The child attempts, through exploration, to determine the novelty of new events and objects. The child may use an object as a tool, such as using a stick or string to obtain an item. The baby is capable of experimenting to solve a problem.

Period 6 (1:4 to 1:6 or 2:0) The child has the cognitive capacity to invent new means through mentally combining what was learned from previous experiences by reflecting on past events and anticipating new events. The ability to realize the permanency of objects is achieved. It is known that objects exist independently. Symbolic acts occur, such as pretending to sleep, eat, etc. A mental representation of reality is possible.

Ingram (1978, 1974) using Piaget's six developmental periods studies language acquisition in children. Ingram (1978, pp. 280-283) identified three periods that may relate to periods 4, 5 and 6 in the sensori-motor stage.

Piagetian periods	Description of Ingram's Linguistic Periods
4 and 5	Period 1 (0:10 to 1:5) One word at a time; words have a variety of functions, e.g., as wish, request, etc. Small vocabulary.
4 and 5	Period 2 (1:6 to 2:0) One word at a time at onset; use of single words in semantic roles such as agent, object, use of sequences of
6	one-word utterances; rapid growth of vocabulary; month or two later vocabulary up to 50 words; onset of multi-word utterances; several months later onset of information function; onset of references to absent objects and past events.
6	Period 3 (2:0 onward) One-word utterances greatly reduced. Onset of ideational and textual functions (C. F. Halliday, 1975).

Ingram (1972, p. 283) redefined the sixth period in Piaget's sensori-motor stage. During this period the onset of mathetic function begins; symbolic play emerges, including symbolic schemata and linguistic play. Later references to past events occur while symbolic play increases in range. Moreover, the child begins to make those great discoveries of life referred to by Vygotsky (1962, p. 43) by asking, "What is this?" This leads to the capacity to have mental representations. Information begins to function in the absence of objects and for past events. Symbolic play becomes advanced.

Bloom (1973) conjectured that a child must cognitively mature to the stage of object permanence before rapid vocabulary growth can occur. Corrigan (1976) found that object permanence was not necessarily a prerequisite for fast vocabulary acquisition. Ingram (1978, p. 284) concurred with Corrigan's position.

Snyder (1975) searched to understand the relationship between linguistic and cognitive developments and found that only period 5 in Piaget's sensori-motor stage correlated with language development. At this age (1:0 to 1:4) tertiary, circular reactions are possible. Ingram cautioned that findings as of now on the relationship between cognitive and linguistic developments are only preliminary. Bowerman (1976) has agreed with Ingram.

As indicated by Oleron (1977, P. 153) Chomsky does not accept the stages of development postulated by Piaget and Piaget criticized Chomsky for overemphasizing innate structures. Piaget dealt almost entirely with physical based information and action as related to cognitive development. Piaget argued that rational structures are not inherent nor perceivable in nature. They are constructed.

Constructing then, at times, requires the individual to go against what is suggested by perception. Since the child has focused, from the beginning, upon immediately perceivable impressions, he must fight against firmly established habits in develping a rational system. Initially perception and activity are dominant. In time language can help the individual to be relatively independent of these and provide access to structures determined by internal rules.

The ideas on the role of language in cognitive development can best be understood by placing them on a circular rather than on a unidimensional line. The unidimensional line indicates that operant conditioning and nativistic views on the role of language in cognitive development are so distinctly different that the twain shall never meet with respect to the contribution individuals can make in constructing cognitive schemata. Both Chomsky and Skinner portray the individual as having little intellectual freedom to contribute to their cognitive development via language. For Chomsky, most of the contribution language can make is genetically programmed in the individual and unfolds in the acquisition of predisposed linguistic competence. For Watson and Skinner, language is little more than the tool humans use to mold perceptions and behavioral patterns that guide them while they act out their lives. In a subtle way the Whorfian hypotheses of linguistic determinism and relativism place the operant conditioning and nativistic views of the role that language gives the individual in his cognitive development adjacent to each other on a circular scale.

Purpose of Language

Before the shift in literacy instruction can occur that is required to prepare readers to reexamine a text in light of preliminary interpretations in order to extend and document those interpretations, the basic, biological purpose for language must be recognized. This recognition requires a more specific theory on the origin of language that will identify how and why the human organism came to be predisposed to acquire language. The information to support this theory must be self-evident enough to cause it to get theorematic acceptance. It can only be accorded a theorematic approval because it can only be proved by accepted premises.

The primary purpose of language is for intra-communication; intercommunication is a secondary use of linguistic competence. Eons before humans used an aural code to exchange thoughts, the individual was involved, on an evolutionary scale, in the gradual process of developing the linguistic competence necessary to give commands to the brain. Today, we observe children using this aural code in what Piaget (1955) defined as egocentric speech and Vygotsky (1962) saw as inner speech in adults. As the human brain system became more complex, the need arose for the organism to have conscious input into its neurological function.

It is proposed that the competence to use a verbal code to instruct the brain has its origins in the autonomic nervous system, more specifically in the parasympathetic system within the autonomic nervous system. Any theory on the origin and purpose of language should explain the following:

1. Language as a neurological function.
2. Language evolved for the biological purpose of causing the human organism to be cognitively more efficient.
3. Humans developed a competence to respond to and to use aural codes that extend far beyond the instinctive responses the sympathetic nervous system makes to sounds that alarm, gratify, etc.
4. Language is a function of the parasympathetic system. It acts antithetically to the response the sympathetic system makes to aural input.
5. How language is similar and dissimilar to other aural codes to which humans respond. How do these compare to the aural input to which animals respond?
6. Identify the biological system in which linguistic competence emerged. Why did it occur in this particular system?
7. How language functions within its biological system. How is its input integrated into the total function of the system?
8. The supporting systems and how their contributions are essential for language to function more efficiently.
9. How inner speech is the prototype for conversational speech. Does the acquisition of inner speech mirror accurately the phylogenic development of linguistic competence?

10. How the ontogenetic acquisition of language mirrors the phylogenic development for linguistic competence.
11. Account for why infants acquire language at a rather rapid rate and without formal instruction.
12. Explain why some idiot savants retain the cerebric placticity necessary to be imprinted with music and lyrics while normal neurological development inhibits this.
13. Account for linguistic diversification among the different speech communities.
14. Delineate between the linguistic and cognitive functions of the brain in a manner that shows how each supports the development of the other.
15. How a literate use of language has a greater effect upon cognitive development than conversational speech does.
16. How language may be used more effectively in the instructional/learning process, especially in the literate use of language.
17. Explain why language may be used therapeutically in settings such as counseling.
18. Explain why language may be used to mentally and emotionally program and deprogram people.
19. Explain the role of language in biofeedback programs, hypnosis, the activities of fakirs, etc.

THE THEOREM: THE BIOLOGICAL CAPACITY FOR HUMANS TO CONSCIOUSLY USE AN AURAL CODE EVOLVED: (1) AS AN EXTENSION OF THE PARASYMPATHETIC NERVOUS SYSTEM TO COUNTERACT THE INSTINCTIVE REACTIONS THE SYMPATHETIC NERVOUS SYSTEM MAKES TO AURAL CODES FOR ALARM, DISTRESS, RELAXATION, ETC., AND (2) TO GIVE THE HUMAN SPECIES THE ABILITY TO USE THIS CODE TO COMMAND THE CEREBRAL CORTEX TO DIRECT THE INDIVIDUAL TO BEHAVE IN A MANNER TO OVERCOME THE PREDISPOSITION FOR PARSIMONY WHICH PREVENTS ONE FROM REALIZING HIS OR HER BIOLOGICAL POTENTIAL.

Discussion

Language evolved biologically for the purpose of extending the function of the parasympathetic neural system to a level of consciousness that permits humans the option of having greater control over their autonomic neurological system than that which can be achieved by any other animal. There are two types of neural functions in the autonomic neurological system. They are the sympathetic and the parasympathetic; they function antithetically to each other. The sympathetic nerves serve the viscera, glands, heart, blood vessels, and the smooth muscles. Parasympathetic nerves originate in the midbrain, the hindbrain, and the scarl region of the spinal cord. They do such things as constricting of the pupils, dilating of blood vessels and salivary glands, slowing of the heartbeat and stimulating the digestive and genitourinary systems.

The sympathetic system causes the body to react swiftly to emergencies. In the "fight-or-flight" reaction, the stomach tightens, blood pressure increases and adrenalin pours into the system. The parasympathetic nerves slow and relax the same organs the sympathetic nerves constrict or tighten. Together these two systems enable the organism to work smoothly, yet to respond quickly to emergencies.

The evolutionary process has created many forms of animate life that have neurological systems sensitive to aural codes. Certain intuitive cries and calls cause the sympathetic nervous system to prepare animals, including humans, for specific performances, ranging from combat to mating. It is believed that these aural codes stimulate the limbic system within the brain.

The limbic system is the center for emotions, such as those aroused by music and poetry. This system is buried deep in the brain. It has been referred to as the midbrain which implies it is between the oldest and newest sections of the brain. MacLean (1973) and Sagan (1977) have discussed the concept of a triune brain. The triune brain is a product of evolution with the oldest section, the Reptilian Complex, being embedded in the core of the brain. The evolution of the human brain occurred opposite to the growth of a cabbage. The newest part of our brain is on the outside while it is internal in the cabbage. The newest part of our brain is the cerebrum. Thus, it sits on top of the thalamus, pituitary gland, cerebellum, pons and medulla. The limbic system originates in an area of the brain older than the cerebrum. Many of the physical and psychological states (fear and courage, hunger and satiety, anger and sexual urges) common to humans and animals have been aroused in laboratory animals by stimulating the limbic system in various places with electrodes.

Sagan (1977, p. 58) described the brain this way:

> The most ancient of them (members of the triune brain) is surrounded by the midbrain (and is made up mostly of what

> neuroanatomists call the olfactostriatum, the corpus striatum, and the globus pallidus). We share it with other mammals and the reptiles. MacLean calls it the reptilian or R-Complex. Surrounding the R-Complex is the limbic system, so called because it borders on the underlying brain. . . .We share the limbic system with the other mammals but not, in its full elaboration, with the reptiles. It probably evolved more than one hundred and fifty million years ago. Finally surmounting the rest of the brain, and clearly the most recent evolutionary accretion, is the neocortex. Like the higher mammals and the other primates, humans have a relatively massive neocortex. It becomes progressively more developed in the advanced mammals. The most elaborately developed neocortex is ours (and the dolphins' and the whales'). It probably evolved several tens of millions of years ago, but its development accelerated greatly a few million years ago when humans emerged.

The animality competence for responding to aural codes began to evolve in some reptiles at least 140 million years ago. Crocodiles, especially alligators, produce sounds that cause the reptilian brain to produce emotional states. Alligators produce the greatest variation in sounds ranging from grunts and hisses to roars that can be heard a mile away. These sounds stimulate the sympathetic nervous system which is a part of the limbic system.

The classes of animals, Aves and Mammalia, that evolved out of the class Reptilia retained and expanded the aural code competence of the crocodiles. Birds, the class Aves, tend to have ears that detect the same kinds of sounds humans hear. They hear and communicate over a similar range of wavelengths as people do. For this reason, humans appreciate avian songs.

Bird songs are the most elaborate series of messages in avian communication. Birds may use their songs to 1) achieve reproductive isolation from other species, 2) announce territorial claims, 3) attract a mate (Perrins & Harrison, 1982, p. 42). Even though the song of each species is characteristic of that species, each individual male bird usually develops a tune that is slightly different from that of his neighbors. While a territory holder will not respond vigorously to a song of a long-term neighbor, he reacts sharply to the song of a stranger. Dialect variations occur among the different song communities just as they do for different human speech communities. However, songs for a specific species do not vary enough to constitute different "languages" for the species as speech does for humans. Birds raised in captivity in sound-proof cages develop a song, although poor and rather muddled, that is recognizable by their own species (Perrins & Harrison, 1982, P. 44).

Like human infants, there seems to be a period when the young bird is particulary sensitive to hearing the songs of others of its kind and is most likely to copy songs from other birds. This sensitive period usually begins when the bird is approaching its first breeding season, which is about one year of age. This is contrary to the human scale for acquiring language. For humans, approaching puberty is a cut off time for ability to acquire a native or first language. Like humans, birds may continue to adopt phrases from others as well as improve or modify their own song throughout their life. In some species, individuals may have a variety of different songs; repertoires of up to six or eight different song types have been described within individuals. It is not known whether each of these variants carries a different message.

Even if the auditory equipment of birds shows many similarities to that of humans, their ability to process sounds that are close together in time is far superior to that of humans. Analyses have shown that the speed of response of the second bird to the first bird is extremely fast, at least three times as fast as is possible for humans (Perrins & Harrison, 1982, p. 44)

The aural codes birds produce instinctively stimulate their sympathetic nervous system. Humans appreciate avian songs because they stimulate the same system in them. The disposition to enjoy and respond to sounds that have systematic and measured beat, stress and accent inspire humans to create music as well as to use language poetically. Humans share with birds and other mammals the competence required to instinctively respond to aural codes that inform, invite, warn and soothe.

One of the most primeval characteristics of humans is that of responding instinctively to aural codes. This characteristic began to emerge with crocodiles and continued to evolve and elaborate in birds and mammals because these species had a greater need to use aural codes than did reptiles. Birds and mammals inherited all the cognitive capacity of the R-Complex described by MacLean. To this, evolution added what each species in these two classes need to survive. In humans and other forms of animate life the cognitive resourcefulnes to respond to sounds that soothe and alarm evolved.

In Greek mythology, the human disposition to be lured by music was recognized in the legend about three sirens, nymphs who used sweet music to lure sailors to destruction. In the dilemma situation protrayed by Scylla and Charybdis, Scylla was a beautiful nymph turned into a six-headed monstrous dog by the sorceress, Circe. Scylla sat in a cave opposite to Charybdis, a powerful whirlpool, in the Strait of Messina. Scylla's snarls and threatening barks both warned and frightened sailors. Thus, we have in the sirens a representation of the dangers humans face from sweet, lulling music; Scylla may represent the fears harsh sounds generate.

The competence to respond intuitively to aural codes eventually was not sufficient for a cerebric system the evolutionary process had made so complex. Rather than create a new gland or organ to exert control, the evolutionary process gradually enhanced the human organism's competence for responding to aural input by extending it to include the ability to produce and to use arbitrary aural codes.

The capacity to respond to aural codes instinctively is a function of the sympathetic nervous system while the ability to use arbitrary aural codes is associated with the parasympathetic system. These functions are comparable to how the sympathetic and parasympathetic nervous systems regulate heartbeat. Thus, in some ways the functions of the instinctive and the arbitrary aural codes are antithetical. A rational use of an arbitrary aural code is antithetical to an instinctive response to a frightening sound.

The evolutionary process which gradually developed the human competence to use arbitrary aural codes began with the crocodilian species at least 140 million years ago. The reptilian competence to intuitively produce and respond to aural codes was elaborated by the evolution of birds and mammals. The competence to respond to arbitrary aural codes by mammals is more pervasive than is the ability to produce them. Humans use arbitrary codes to command and to call their domesticated animals. Some pets become very proficient in responding to these codes. The mammalian competence to respond to arbitrary codes tantalizes those researchers (Fauts, 1973; Gardner & Gardner, 1969; Laidler, 1978; Plooij, 1978; Premack, 1971; Rumbaugh et al., 1973; Seuren, 1976; Shafton, 1976) who have studied linguistic competence/performance in chimpanzees and apes. Unfortunately, these studies have not led to an evolutionary perspective of the development of language. Shafton (1976, p. 102) concluded, "There are several reasons for doubting that language was launched directly in the audible channel, and for seeking protolinguistic beginning in the visible rather than the audible portion of a putative hominid repertoire." Plooij (1978, p. 130) has accepted this conclusion. Shafton (1976, p. 98) wrote, "the target of emerging hominid language must consist of culturally acquired, voluntarily emitted (audible oral) signals, with culture-specific, holophrastic social meanings." Shafton (p. 90) concluded that "language in the first instance was a set of acquired social rituals, with the function of sustaining the fundamentally stable, non-violent mode of hominid social life."

Seuren (1976) has reminded the primatologists that interpreting their data as being linguistic can be no more than an interpretation. Human language is characterized by a highly specific and quite complex set of restrictions. These linguistic restrictions are a part of a species-bound, innate set of strategies and expectations with respect to language. They are a part of the cognitive endowment of every newborn human. Commenting on the neurobasis for language Laidler (1978, pp. 134-135) wrote:

> Evidence from brain lesions (see Geschwind, 1970 for refs.) and from electrical stimulation of the brain (Robinson, 1967; Brickner, 1967) all point to much the same conclusion: that in all but the living Hominidae the loci for vocalizations are to be found in the limbic system of the C.N.S. the same area wherein are found the loci for emotional states. Such a system speaks for the mediation of the diverse types of vocalization with the various emotional states of the animal. There is no evidence that neocortical areas participate in the production or origin of such sounds in the infra-human primate.

> By contrast, the neocortex appears to be in almost sole charge of vocalization in man, except for emotional ejaculations which originate, as in other primates, from the limbic system. . . .

The evolutionary process does not cut straight, clean lines to delineate the characteristics humans use to identify species. Nature's demarcations are ragged, zigzagged lines. These demarcations gradually phase in and out characteristics and competencies. For this reason, varying degrees of linguistic competence are observed in mammals other than humans and other primates. In preparation for the human species to have language, the evolutionary process began developing the competence to comprehend arbitrary, aural codes before commencing the development of the capacity to produce refined aural codes. Such mammals as dogs, donkeys, horses, elephants and goats can respond to but not produce arbitrary aural codes.

Proximity on the evolutionary scale determines how congruent the characteristics and competencies are for those species forming a class. Modern tree-shrews and monkeys differ greater in characteristics and competencies from humans than do modern apes because they are more primal on the evolutionary scale. The minimal congruency of linguistic competence for humans and apes must be at least that degree of this capacity developed before they diverged to evolve into different species. The maximum similarity, if greater than the possible minimum, was realized because survival requirements for apes forced elaboration of what was possessed when the species diverged. It is not possible to determine how much linguistic competence apes possessed before the divergence occurred which led to two different species, apes and humans; it is not possible to determine how much elaboration has occurred. However, it may be possible to resolve how much congruency does occur between the linguistic competence of these two species if we cease viewing language as an institution or an organism and accept it as a part of the neurological system of those species who can in some degree respond to an arbitrary aural code.

Keyan (1978, p. 82) has written a description of language that best described what it is that thwarts the understanding of language. He wrote:

> It is not the aggregation of words that make language; but rather it is the reality and tradition which, through centuries of evolution having gathered behind each word, create the soul and the spirit of language, and make language possible. It is the conflicts of interests, ideologies, traditions, and other manifestations of civilizations that impart meaning to language and close the centrifugal and centripetal circuit of mental communication. Hence, language is a mode of the interpretation of meaning and a method of the expression of the conviction of the individual and the mood of the mind.
>
> Therefore, language should be taken and treated like a living organism, possessing a totality and reality of its own; like the totality of human being, encompassing body, mind, and soul.

> Language, likewise, has a soul and reality of its own, encompassing these, in addition to the mental and grammatical significations of each word. . . .

This may describe culture; it does not describe language. Language can no more be an organism than can our blood or the air we breathe. Language is more analogous to blood and air than it is to an organism or institution.

One may argue that humans can live without language but not without blood or air to breathe. Yes, if language cannot exist in the absence of an arbitrary aural code; but it can and does. Feldman et al. (1978, p. 355) reported, "Our observations of six deaf children not exposed to manual language, over a lengthy period during their early development, show that they do begin to use manual gestures of their own to reveal their thoughts and wishes to others. . . . They eventually begin to join pairs and even longer sequences (up to 13 "words") of these gestures into what we believe are manual equivalents of phrases and sentences." Feldman and her colleagues (p. 356) concluded "we believe we have suggestive evidence that these uninstructed novices, while severely limited in means, do have the internal wherewithal to develop a passable communication system." Drever (1928) believed had all humans been deaf, they would have developed other forms of language as well perfected as existing spoken languages. Kleinpaul (cited by Ribot, 1897, p. 62) presented decades earlier the same view as that of Drever when he wrote, "It is almost an accident that phonetic language acquired so much importance; there is no doubt but that mimetic language, had it been socially accepted in ancient times, would not be inferior to speech in terms of its power, ease, and variety."

Feldman et al., Drever and Kleinpaul have overlooked the basic reason why deaf humans acquire or develop a gestural language in order to support the untenable position that gesture was and is fundamental to the phylogenic and ontogenic development and acquisition of linguistic competence. Deaf humans acquire a sign language to varying degrees because their neurological needs press them to do it. It was not by accident that humans came to use arbitrary phonetic codes; it is an extension of their intuitive competence to respond to specific aural codes. And, as Oleron (1977, p. 101) pointed out, "In contrast to a language which depends upon visual perception, verbal language may be more coherent and thus more manageable and accessible." Oleron (p. 106) hypothesized that the use of speech promotes the development of the cognitive capacity to form abstractions. Verbal language makes it possible to use terms that do not correspond literally to what is perceived. Constant use of these words enables one to go beyond a level of mental activity rooted in perceived reality. Continued application of this type of thinking develops cognitive structures that replace more primal sets, which relied exclusively upon perceptual data.

Oleron (p. 106) observed, "The cognitive functions involved with perception seem least directly connected with language." Oleron

(p. 108) explained that, ". . . perception also functions in purely practical instances in which one responds to perceived objects without benefit of any verbal mediation. . . . language intervenes in perception as a source of information, inquiry, or pressure. . . . Language serves to express hypotheses, interpretations, and suggestions to which one can react in incomplete or ambiguous perceptual situations."

Verbal language makes it possible for one not to be absorbed by reality as presented by perception. Verbal behavior can objectify and make possible a mental distance from the perceptual experience so the perceiver will not be dominated by the present phenomenon or phenomena. The regular use of speech is a useful mediator essential for generating this mental distance since it occurs between the perception of the object or event and the subsequent responses to it. Thus, as pointed out by Oleron (p. 114), "Verbal behavior. . .provides a break during which analysis and thought can occur."

Deaf people limited to gestures and sign language are denied the cognitive power verbal language makes possible. As explained by Oleron (p. 113), ". . . deaf children seem to be dominated by their perceptual experience and their immediate impressions of the situation." He went on to explain, ". . . the deaf are unable to establish distance from situational characteristics. Their dependence upon external qualities is found even at a physical level." While deaf children demonstrate few deficits in solving concrete problems (Oleron, 1957a) they show marked deficits when required to use a mediator in solving a problem. Deaf children are significantly less able to generalize than hearing children.

The lack of verbal language greatly affects deaf children's ability to form the abstractions essential to concept formation. They form categories which are more restricted and less general than those of hearing children (Oleron, Gumusyan & Moulinou, 1966). The more complex a classification task becomes the more difficult it is for the deaf person to perform., Back in 1940 Heider and Heider found no significant or near significant difference between deaf and hearing children in learning to name colors and to label stimuli one way and organize them in another. But Furth (1961a) has discovered that deaf children have more difficulty than do hearing children on a double alternation task. And MacAndrew (1948), Oleron (1951), and Pettifor (1968) have reported that tasks requiring the classification of materials three different ways are more difficult for deaf subjects. The first classification was as easy for deaf as it was for hearing subjects; the second classification was more difficult for the deaf subjects than for the hearing; the third was even more difficult.

The ability to solve multiple classifications requires going beyond what is immediately perceivable in order to organize response patterns. Verbal language makes this possible whereas it cannot readily be achieved by perceptual input alone. Speech serves as an aid in the construction of the cognitive schema required to place and hold an object mentally in three different categories. Deaf subjects are dominated by perceptual characteristics and focus upon objects unidimensionally. Rather than dissociate, they tend to fixate on the first perceived characteristics. This makes the abstracting process required for classification more difficult.

Deaf subjects have more difficulty than do hearing subjects in cognitively manipulating even nonverbal materials if a specific task requires the use of language (Herren & Deleau, 1974). Such linguistic tasks of naming, classifying, using transformational rules are more difficult for the deaf even when approaching them with nonverbal materials. Rozanova (1970) found that the deaf are able to memorize gestures more easily than words. In support of this, O'Conner and Hermelin (1973) observed that the deaf perform at a lower level than the hearing when tested for the retention of syllables but not when tested for memory of human, facial details. With deaf subjects using sign language and hearing subjects receiving the same lists of words auditorily, Bellugi and Siple (1974) found that deaf subjects were less successful than hearing subjects in performing a memorization task which required establishing and reproducing a series of items.

Deaf subjects are not always inferior to hearing subjects in responding to research tasks. Myklebust (1960) reported that deaf subjects were superior to hearing subjects on certain tasks such as the reproduction of drawing and movement patterns, but inferior on tasks such as those involving short-term memory. The deaf surpass or are equal to the hearing in some tasks because the cognitive processes required for these activities are independent of language. Instead of reflecting their superiority, it may suggest that hearing inhibits the refinement of visual perception. Back in 1917, Linder discovered that hearing subjects had a reduction in the acccuracy of concrete representation. Linder suggested that the development of symbolic processes was paid for, in part, by a loss in the richness of concrete images. Ehrlich and Bramaud du Boucheron (1974) agree with Linder. They, too, believe hearing children may also be at a disadvantage in dealing with figurative materials. Normal developmental trends may render them increasingly insensitive to concrete details and characteristics. These two researchers demonstrated the superiority of deaf children over the hearing on a learning task involving lists of words. The words were regularly used by the deaf in their schoolwork. They were more limited in meaning than vocabulary typically used by the hearing. For the deaf, the words were more available and easier to memorize than for the hearing who were "handicapped" by the semantic richness represented by each of these words for them.

With Piaget's perspective on cognitive development guiding his inquiry, Furth (1961b) found that hearing and deaf subjects between the ages of 7 and 10 did not differ on an extremely simple color-object association task. A difference in favor of the hearing became evident for the 11- to 12-year olds. Progess in task performance was very rapid for hearing children above 10 but was much less distinct for deaf children. As reported by Oleron (1977, p. 156) Piaget was well aware of the advantages of experimenting with deaf children in order to clarify the relationship between language and thought (Piaget, 1954, 1963; Piaget & Inhelder, 1959, 1971). Piaget believed that the deaf were indeed able to function at the operational level. Of course, he used his research to support his thesis that cognitive development is independent of language.

Using conservation tasks to evaluate the performance of the hearing and the deaf for concrete operations Oleron and Herren (1961) and Furth (1964, 1966) found deaf subjects to lag from five (Furth) to six years (Oleron & Herren) behind hearing subjects. Working with seriation tasks, Borelli (1951) found insignificant differences for single seriation between hearing and deaf subjects; however, for double seriation tasks, the lag was more evident for the deaf. Research involving time seriation conducted by Reggrobellet (1963) showed a 4-year delay in the performance level of the deaf when compared to normal subjects studied by Piaget.

Caouette (1964, 1974) has studied the cognitive process of classification by deaf subjects. He used Piagetian procedures with 8-, 9-, 10-, 12- and 15-year-olds. In all age groups, a developmental lag existed in the deaf subjects. A delay was found in "infralogical" competence and spatial organization that required the conservation of order in the tunnel and ball task, the decentration of perspective, etc. Half of the deaf subjects were unable to master the seriation task before the age of 15. This finding also held true for the conservation of area and of quantity of liquid.

Caouette interpreted these results as evidence that language is necessary for the attainment of operational thought. This interpretation is antithetical to Piaget's thesis that the deaf could function at the operational level of thought without the benefit of language.

Youniss and Furth (1965) analyzed deaf subjects' capacity for observing and recognizing the concept of transitivity--car 1 hits car 2; car 2 hits car 3; car 1 is the source of the force that caused car 3 to be hit. Deaf children performed as well as hearing children of the same age. However, when Youniss and Furth (1966) added a perceptual, variational component to the task, the deaf subjects made more errors than did the hearing. The perceptual, variational component added involved congruent/non-congruent conditions. A congruent condition occurred when a larger object pushed a smaller object; in a non-congruent situation, a smaller object pushed a larger object.

Piaget believed that formal, cognitive operations are directly related to language (Inhelder & Piaget, 1956). In his scheme of cognitive development, verbally based relationships are not really mastered before one acquires the mental maturation required to think in terms of propositional logic. He emphasized that the essential component of formal thought is its potential for dealing with the hypothetical and assessing the reality of the various possible combinations of elements. He assumed that formal thought is involved in the experimental manipulation "of the organization of experience and from the reading of the parts as given" (Inhelder & Piaget, 1955, p. 222).

In looking at 15-year-old deaf subjects' grasp of the laws of equilibration and the relationship between weight and distance, Caouette (1973, 1974) found that they only partially understood these two. No subject functioned at the operational level. Most of them did achieve a level similar to that observed by Piaget with 10- to 11- and 12- to 13-year-olds. Ross (1966) and Furth and Youniss (1971) have used tasks developed from experimental methodologies described by Piaget and Inhelder (1951) to study formal operations in deaf subjects. Ross found that these operations developed similarly for hearing and deaf subjects between the ages of 11 and 15. Furth and Youniss studied a group of 14- to 20-year-old deaf subjects and similar-aged hearing subjects from a rural sample. Similar success rates were found for the two groups when the deaf subjects' performances were compared to an urban, hearing sample. Some slight differences were observed; they favored the urban sample. After a 5-week training program, Furth and Youniss found that 28% of the deaf subjects improved in formal operations against 53% for the rural hearing subjects and 75% of the urban hearing groups. These differences are probably due to variation in language competence among the groups.

Lags in the attainment of Piaget's stages of cognitive development by the deaf in comparison with the hearing do not invalidate Piageian schemata. The research data are more supportive than not of this schema. However, as Oleron (1977, P. 165) wrote: ". . . the explanatory potential of Piaget's theory is weakened to the extent that one refuses to admit the existence of developmental lags in deaf children or, having acknowledged them, refuses to attribute them to language rather than to the influence of experience and environment." Research focusing on the deaf indicates:

1. Deaf children understand very early the concept of identity, which can be expressed by gesture. This identity is based upon perceptual similarities and does not go beyond what is observable. (Oleron, 1977, p. 164)
2. Experimental findings demonstrate that the deaf acquire the cognitive maturity at a slower pace than do the hearing which is required to perform successfully some Piagetian as well as non-Piagetian tasks. (Oleron, 1977, p. 161)
    a. It appears that the deaf succeed as well as the hearing on tasks that require only visual perception to solve. (Oleron, p. 162)
    b. Tasks that require that one go beyond what is immediately given are more difficult for the deaf than the hearing. (Oleron, p. 162)

The research data acquired in studying the deaf belie Drever's assumption that if all humans had been deaf they would have developed another form of language as well perfected as spoken languages are. The data also seriously question Kleinpaul's opinion that humans almost by accident developed phonetic languages and phonetic languages arbitrarily became as significant as they are in human behavior. The evolutionary process over a long period of time developed in humans the apparatus necessary to produce refined phonemes. This was a biological "decision," not a human choice. For a definitive discussion of the evolution of the human vocal tract in comparison with other primates see Lieberman (1975), Lenneberg (1967), DuBrul (1958) and Nemai and Kelleman (1929).

If use directed the evolution of the human vocal tract, inner speech as defined by Vygotsky (1962) may well have been responsible, not conversational speech. Again, the thesis of this paper is: Human aural language evolved primarily as a medium so the individual could have a conscious input into the functions of the brain. Conversational speech is a byproduct or a secondary function. The refinement of the vocal tract made it possible to produce far more distinct phonemes than necessary for an idiosyncratic aural code an individual needs to give commands to the brain. Thus, in the beginning of the evolution of speech competence and performance, individuals had their own personal codes. The codes were limited; cognitive needs forced individuals to generate personal aural codes.

Systematic observations of infants reveal that they are under cognitive pressure to think. Hodgkin (1976, p. 7) wrote, "It now looks as though babies can formulate questions of a kind as soon as they are born. They have the brain power to do this but have not acquired the skill to manifest their 'doubts and hypothesis.' " Hodgkin cited Bower (1971, 1974, 1975) at length in support of this view. He (Hodgkin, 1976, pp. 7-9) gave the following synthesis of Bower's position. The elipses are a result of our synthesizing.

> In the first few days of life one can demonstrate learning of a very high order. . . infants can learn not one but a pair of response-reward contingencies, . . . a three-day old infant can learn to turn his head to the left to obtain reward, when a bell sounds, and to the right when a buzzer sounds. He can learn the bell-left, buzzer-right discrimination in a few minutes. Having learned it he can learn to reverse the discrimination if the experimenter reverses the contingencies, ... The learning displayed here is possibly of a higher order than is ever displayed by an infra-human.
>
> Examination of the behavior shows that the activity is not random. The infants seem to be testing hypotheses, trying out sequences of movement to discover which one operates at the moment. It thus seems that the pleasures of problem-solving are sufficient to motivate behavioral and mental activity in these young infants. If a learning situation is interactive, the infant will demonstrate that he can learn: if it is not, and his only motive is the

> prospect of reward, then the infant will not demonstrate that he can learn. . . .

Problem-solving, hypothesis-testing, and learning for its own sake along with a form of imprinting for the phonological and syntactic systems may well be the primary components of the linguistic acquistion device proposed by Chomsky (1962). To understand the origin of and the purposes for language requires accepting the currently developing view that new-born children have strongly patterned, innate yet flexible competence. When we see the human infant beginning life with an impressive ability to make sense of his perceptions of people and things and his remarkable capacity for learning, we will appreciate his intellectual prowess when he calls a strange man "daddy," an elderly woman "grandma" or a cow "doggie."

These crude forms of perceptual classification (all male adults belong to the category: daddy) become refined as the child's linguistic competence increase. A newborn can intuitively segment the phonemes of any possible language and synthesize them into an infinite number of syllables and words. However, this capacity is greatly reduced as the child becomes exposed to the phonemes of his speech community. The phonemes an infant hears imprint him psychologically almost as the first object a duckling sees imprints it. This imprinting also occurs for syntax.

Since the speech apparatus is refined enough to produce far more distinct phonemes than required for one language and the temporal flow of spoken words may vary without negatively affecting meaning, inordinate confusion would interfere with, if not prevent, the acquisition of language. In order to avoid this, the human infant is imprinted with both the phonology and the syntax of his native language. This psychological impressing permits an early use of language by the child to escape the limitations of perception. Perception becomes less and less important as language competence increase. Thus, language is the brain's escape from the chains of perception.

The possible variations in the production of phonemes and syntax along with the arbitrary assigning of phonemic combinations to represent difference objects, events, ideas, actions and qualities account for the emerging of different languages among human communities. If the phonological and syntactic systems of a native language are acquired through a form of imprinting, then it becomes imperative that formal education begin in the native language of the child. In fact, since language is an integral part of the human neurological system, then to try to teach a child with a language he does not understand makes his cognitive capacity for learning dysfunctional. It is antithetic to the very purpose of why the child experienced cognitive pressure to acquire his native language--to acquire language in order to be able to give commands to his brain so he will not be dominated by perception. To try to teach a child using a language he does not comprehend forces him to return to the dependence upon perception which greatly reduces the capacity for learning.

Learning is the most exciting thing an infant does. Observing a child acquire language reveals how a child learns. The child's use of what Piaget described as egocentric speech offers a chance to observe a novice use language to have contact with as well as to give commands to the brain. Piaget (1926) believed egocentric speech decreased to extinction once social language was mastered. However, Vygotsky (1962) suggested it became inner speech; that subvocal speech we use for intracommunication. Vygotsky (p. 135) described it this way:

> The decreasing vocalization of egocentric speech denotes a developing abstraction from sound, the child's new faculty to "think words" instead of pronouncing them. This is the positive meaning of the sinking coefficient of egocentric speech. The downward curve indicates development toward inner speech.

We do not see inner speech as submerging to a subvocalization status. We perceive egocentric speech as evidence that social language emerges out of inner speech, with inner speech serving the primary function of language and social speech a secondary function. Thus, we posit that inter-conversational competence is based upon inner speech competence. To the extent to which one can communicate well with himself is reflected in how well he communicates with others. Unfortunately, communication with oneself is not stressed in our language arts curricula; for this reason student acquisition of skills in literacy is disappointing. Literary instruction emphasizes only the secondary function of language.

Once we accept the competency of the infant, we are in a position to observe, in part, how our species acquired language. Since the ontogenetic acquisition of a competence is greatly accelerated in comparison to the species as a whole acquiring the phylogenic competence, it is important to observe even what appears to be trivial if we are ever to understand how humans came to have language. A baby may demonstrate during one month of life what it took the species five million years to acquire phylogenically. Children who are delayed in language acquisition are a good source for observing to see how the species acquired language. Our observations of normal and abnormal speech development support our thesis that a child acquires inner speech competence before conversing with others. As he becomes confident his speech becomes vocal, beginning with one word and progressing to several words in a syntactic arrangement. In the process of becoming competent in the use of vocal language, inner speech erupts at times as though it is vocal. This is the speech Piaget described as being egocentric. He failed to recognize that it was like a geyser erupting from a subterranean stream.

Since phylogenically human language had its first expression in idiosyncratic inner speech, we should expect to observe this stage in the ontogenetic acquisiton of language by the individual. We do. One reaction to Chomsky's surface/deep structure theory was to search for a universal grammar common to all children in the early stages of language acquisition (McNeil, 1966a, 1966b, 1970); Braine, 1963, 1971; Brown, 1973; Brown & Bellugi, 1964; Bloom, 1973, 1971, 1970; Ervin-Tripp, 1973, 1974). No universal grammar has been discovered that describes children's acquisition of a common language, and certainly not for all the languages spoken by the human race. Such a grammar cannot exist because each child approaches the learning of a social language from his own peculiar competence in an idiosyncratic inner speech.

After the species had phylogenically acquired a general competence for inner speech, conversational language had a base from which to emerge. Gradually talk emerged with each clan or tribe developing its own dialect. Within the clans or tribes, the nuclei which initiated the development of the dialect may have varied from being familial to ritualistic. Certainly, the impetus for developing a dialect was not the same for every evolving speech community.

The use of an aural code for inter-communication caused the human organism to gradually extend and vary its linguistic competence through the evolutionary process. Since learning a system of consistent phonemic and syntactic inflectional patterns requires an attending to data that even most adults find difficult to do and soon become discouraged, nature intervened by developing for humans a cerebric sensitivity to aural patterns that results in a form of imprinting. Rather than evolve an entirely new mechanism to aid humans in the acquisition of language, nature made use of the cerebric sensitiveness to imprinting already developed in some members of the class of Aves, especially ducks. Ducklings are so sensitive to imprinting that they will follow any moving object first seen. They do not follow for the purpose of receiving food; "they gain great advantage by remaining in the presence of their mother so as to benefit from her warning cries and general watchfulness" (Perrins & Harrison, 1982, p. 122).

All forms of life are interrelated because the creative performance of nature is a process of synthesizing the characteristics of life in general with those of some specific forms to generate new forms. For this reason, the human species is a mosaic of all life; it is the most recent new species nature has evolved. One specific characteristic in the human mosaic which may have come to us by way of Nature's experience with the bird family Anatidae (swans, geese and ducks) could be the cerebric malleability necessary for imprinting. Let us not forget that the animal classes of Aves and Mammalia have within their category species very sensitive to aural codes; furthermore, both have species that "speak" dialect variations of the "speech" codes of their group.

Some birds are like humans in that "there seems to be a period when the young bird is particularly sensitive to hearing the songs of others of its kind and is not likely to copy songs from other individuals. This sensitive period is often when the bird is approaching one year old--coming up to its first breeding season. Nevertheless, birds may go on adopting phrases from others and improving or modifying their own songs throughout their life (Perrins

& Harrison, 1982, p. 44)." Research by Wolff (1966) demonstrated that even very young infants have remarkable perceptual and learning abilities; coupled with the ability to vocalize and with the special sensitivity to vocal sounds which leads to extensive learning about language in the first year (Dale, 1976, p. 204). Halliday's (1975) report on his son's, acquisition of language verifies Wolff's work as well as that of many others (Weir, 1962; Bloom, 1970; Bowerman, 1973; Brown, 1973; Ervin-Tripp, 1973) who intensely studied the language acquisition strategies used by children. Halliday suggested that Nigel may have begun demonstrating linguistic competence as early as nine months and for sure by 10 1/2 months. By the 16th month of age, Nigel had demonstrated five (instrumental, regulatory, interactional, personal, imaginative) of the seven functions Halliday assigned to language. The seven functions are:

1. Instrumental--the language user obtains things or services of others that he wants--"I want."
2. Regulatory--The language user regulates or controls the behavior of others--"Let's do," "Don't do."
3. Interactional--The language user greets others as well as including other kinds of verbal interchange with no other purpose than the recognition of mutual awareness.
4. Personal--The language user makes expressions of self-awareness, including expressions of interest, pleasure, disgust, etc.

5. Heuristic--The language user inquires in order to get information.
6. Imaginative--The language user transcends the immediate perceptual field and enters either the past or the future. One may use song, story, myth, fable, poetry, history, science, etc. to accomplish this.
7. Informative--The language user either responds to another's heuristic use of language or voluntarily offers the information.

In order to demonstrate the five of these that Nigel did by the age of 16 months, he could not have been giving much attention to the phonemic and syntactic/inflectional patterns which indicates that it is not necessay for a child to attend to these consciously. Imprinting occurs the moment the child intuitively recognizes a consistent linguistic pattern. The day a child switches from the grammatical use of words that are expressions of irregular tense and plurality markers to markers for regular conjugated verbs and plurality markers one can be sure that the child has been exposed to enough language in his speech community for the imprinting to occur. When a child begins to say:

goed for went,
seed for saw,
cutted for cut,
teached for taught,
sleeped for slept;

and

mans for men,
sheeps for sheep,
childs for children,
deers for deer,
peoples for people,

imprinting has occurred for the expression of past tense and plurality. One of the major tasks in elementary education is to get children to depart from the consistency which they have been linguistically imprinted to follow for past tense and plurality.

Long before a child is imprinted for past tense and plurality, he is imprinted for the phonemic distribution within syllables. Syntactic imprinting occurs later than does that for phonemic distribution and inflections. The lack of direct evidence that imitating tasks or exercises accelerates the acquisition of linguistic features supports the thesis that these occur through imprinting. Cazden (1972, p. 91) wrote, "The commonsense view of how children learn to speak is that they imitate the language they hear around them. In a general way, this must be true. A child in an English-speaking home grows up to speak English, not French or Hindi or some language of his own. But in the fine details of the language-learning process, imitation cannot be the whole answer."

At the turn of the century (1907) Clara and William Stern suggested:

> It might be assumed, . . ., that there is an observable correlation between a child's speech and its environment, and that consequently the process of language acquisition by a child would be considered simply as the mechanical acceptance of external speech forms and meanings through imitation. In contrast, those who emphasized the internal contributions a child makes to its own speech looked for productions having nothing to do with imitation. They sought so-called "word inventions" or early manifestations of self-produced logical activity. Both views are capable of obscuring the real situation. . . ..
>
> We believe that the proper position is a synthesis of these two opinions. In his form of speech a child learning to speak is neither a phonograph reproducing external sounds nor a sovereign creator of language. In terms of the contents of his speech, he is neither a pure associative machine nor a sovereign creator of concepts. Rather, his speech is based on the continuing interaction of external impressions with internal systems which usually function unconsciously; it is thus the result of a constant "convergence." The detailed investigations pertaining to the development of speech and thought should determine the relative participation of both forces and also show how they accommodate each other (Reprinted in Blumenthal, 1970, pp. 86-87).

Foss and Hakes (1978, p. 270) wrote, "There is clear evidence that imitating utterances is not a necessary condition for language development." This evidence has been acquired by the research of such scholars as Ervin-Tripp (1964), Kemp and Dale (1973), Ammon and Ammon (1971) and Gleason (1967, p. 8) who concluded, "In listening to us, the children attended to the sense of what we said, and not the form. And the plurals and past tenses they offered were products of their own linquistic systems, and not imitations of us."

Children attend only to the sense of what they hear because an innate capacity "sifts" out the systematic patterns of the phonemes, syntax and inflections they hear and imprints it in their brain. Because of this children can acquire a first or native language rather rapidly. Children can refine or modify the imprinted patterns with a great deal of conscious effort. Carol Chomsky (1969) has presented a detailed description of what happens to the syntax of children from five to ten years of age.

Until a child is cognitively imprinted for a specific linguistic pattern the conclusion that Foss and Hakes (1978, p. 275) reached is valid. They concluded that reinforcement, imitation, expansion, and frequency of modeling, from the data available, appear not to be very important influences on what children acquire or on how early they acquire it.

Imprinting appears not to be important or essential for vocabulary development. The semantic system of a language is too open for imprinting to occur. Imprinting applies only to closed systems. Anglin (1970, p. 99) put it this way: "Lexical generalization appears to be an extremely gradual process which may never be complete. This lethargy contrasts with the speed of the acquisition of grammar much of which is apparently over when the child is three and one-half or four years of age" (McNeil, 1968). Vygotsky (1962, p. 124) also saw word meaning evolving gradually. He wrote, "Word meanings are dynamic rather than static formations. They change as the child develops; they change also with the various ways in which thought functions."

The cerebric state necessary for imprinting appears to be prepubescent (Lenneberg, 1967; 1969). After the onset of puberty totally learning a first or native language is impossible. That is, a person who, after the onset of puberty, suffers the complete loss of his language due to an accident or illness will not learn the language again. Curtiss, et al. (1974) have reported one major exception to this condition. They reported that a subject of theirs acquired a first language after she was 13.

It is apt to describe the human race as the sonic species. Sound is loved so much that music was and continues to be created for enjoyment. The cadence of rhyme and rhythm creates emotional states in us. No other species has a brain so susceptible to so many types and variations of sound. The sounds and music that mesmerized parents when they were children, especially during adolescence, are often sources of dissension between them and their children; a different beat mesmerizes the children. In the different beat, parents hear decadence; in it the children experience a freedom from that music which engulfed their parents' brains less than two decades ago. This would be most comical if it did not produce familial disruptions. Members of the sonic species respond to sounds as if they are opiates.

Ancient bards and modern orators as well as the demogogues of all ages have known and used the power that sound can have over their kind. Healers have chanted away the pains of illness and the woes of the distraught. Charlatans have fleeced the gullible with a fast rhythm of promises. With a few kind words, neighbors have softened the hard grief caused by death and enlarged the joy of a birth. Yes, the sonic species have their psalms and their lamentations to assuage the soul because of language.

For millennia some humans have known how to use language to place the brain under hypnosis. In this state, suggestions can awake memories that sleep in the subconscious. In speech they flow to the awareness of others but remain forgotten in the brain that stores them. This use of language humans fear most because it invades the privacy essential for individuality and dignity. Perhaps this fear of using language to undrape the personality is why no society has acquired the knowledge of how language functions within the neurological system. Depersonalization is the greatest threat language holds for humankind. However, achieving completely our biological potential is only possible through language.

Modern psychoanalytic procedures of using the power of talk to reduce and to ameliorate symptoms of mental illness have their origin in hypnosis. At the beginning of the twentieth century, it began to be understood that "ideas" alone could be responsible for mental illness. For decades practitioners had been puzzled and confused by cases having no apparent physical disorder; some came to suspect that the nervous system might be degenerating. Before human scholars were sophisticated enough to propose such theories as that of a degenerating nervous system, the mentally ill were thought to be possessed by evil spirits. Language was used in rituals and in magical ways to cast the evil spirit or spirits out of the possessed.

Using the concept of "free association" Freud (1905) went beyond hypnosis and developed techniques designed to generate the psychological state of catharsis. During this state, the patient brings to consciousness and expresses the anxieties and problems responsible for his mental illness; this alleviates, or at least ameliorates, the condition. Freud began what is gradually evolving toward the professional expertise required to guide an individual to use language to achieve one of the basic biological reasons for its evolving. It is to relieve the brain of ideas that generate biochemical imbalances that cause mental illness in varying degrees.

Fortunately, the majority of the human race use language to relieve the brain of ideas that lead either to mental illness or to criminal behavior. Only small minorities over-repress or express ideas that lead to asocial behaviors. These are the people who need and benefit from counseling and/or psychoanalysis. If it were not for language, the whole human race would be either inorganically psychotic or criminally insane.

Alfred Adler developed his theories beyond that of Freud. He believed that striving for superiority and the urge for self-realization were the most important influences on human personality. Freud stressed sexuality as being a major source of mental problems. Thus, Freud emphasized sexual desires while Adler saw people as being motivated chiefly by social urges. Human motivation is generated and driven by inner speech. Through the support of language one guides himself in doing what is necessary to achieve the innate desire for superiority. The extent to which one's actions deviate from guiding him toward realizing his actual biological potential is a result of a lack of the linguistic competence essential to command the brain to function efficiently. Of course, there are sundry reasons why humans do not develop their innate potential for linguistic competence and apply it in taking charge of their brain.

Carl Gustav Jung correctly saw humans as being related to other animals through the evolutionary process and insightfully concluded that instinctive archetypes inherited from other species affected human behavior. These instinctive traits inherited from other species are significant reasons why humans acquired language. Language offers the brain the option of being rational when experiencing archetypes that cause other animals to behave instinctively. Archetypes are instinctive responses to shadows, sounds, odors, displays and the field of vision in general. These responses are based upon perceptual input. Humans can use language to rationally process perceptual input. In a way, they use language to deperceptualize.

The neo-Freudians such as Erich Fromm, Karen Horney, Erik Erikson, and Harry S. Sullivan have given greater emphasis to interpersonal relationships and the social environment (Wilson, 1980). Horney believed that Freud's overwhelming emphasis on sex was not a sufficient explanation for neurotic problems, especially for every society and every era. Language is a release for general as well as specific ideas that inhibit efficient brain function or cause malfunctions. Erikson recognized that psychological traumas are not restricted to infancy and early childhood. Language is used throughout life to release ideas and to correct the function of the various members of the brain.

One reason why children acquire language so rapidly may be to provide them with this linguistic release. The depth of probing during psychoanalysis varies depending upon the age of the patient and the age at which the psychological trauma ensued. Psychoanalysis is evidence that one major function of language is for the preservation of mental health. Those who do not use this function of language on their own eventually require some form of counseling or psychoanalysis.

Language can also be used to support the maintenance of physical health. For centuries Oriental masters of Zen and yoga have controlled to varying degrees the autonomic functions of heartbeat, blood pressure and body temperature. As reported by Wilson (1980, p. 160), "Hypnosis, biofeedback, meditation and yoga are some of the ways of tapping this other aspect of the mind and gaining new approaches to psychological and physical problems, such as stress. . . . With training in scientific biofeedback or self-hypnosis, people can combat stress quickly and acquire a new kind of mental and physical self-control. But it is no more than a modern means of releasing an age-old potential that has always been built into the human brain."

Once it is realized that the origin of language is biological and within the autonomic nervous system, it becomes clear why humans may learn to have a moderating control over the autonomic physical and psychological functions of their bodies. As Nourse (1980, p. 149) explained, ". . .the distinction between the voluntary and involuntary nervous systems--a time-honored fundamental of physiology--is becoming blurred, as researchers train selected subjects to apply their will to regulate such 'involuntary' functions as blood pressure and heart rate." Language is the competence that blurs the distinction between the voluntary and involuntary nervous systems.

Language may be used to harness the powers of the brain. Commenting on the relationship of language to intelligence Darwin (1952, p. 278) wrote:

> Through his powers of intellect, articulate language has been evolved; and on this his wonderful advancement has mainly depended. As Mr. Chauncey Wright remarks: 'A psychological analysis of the

> faculty of language shews (sic), that even the smallest proficiency in it might require more brain power than the greatest proficiency in any other direction.' He has invented and is able to use various weapons, tools, traps, Sc., with which he defends himself, kills or catches prey, and otherwise obtains food. He has made rafts or canoes for fishing or crossing over to neighbouring fertile islands. He has discovered the art of making fire, by which hard and stringy roots can be rendered digestible, and poisonous roots or herbs innocuous. This discovery of fire, probably the greatest ever made by man, excepting language, dates from before the dawn of history. These several inventions, by which man in the rudest state has become so pre-eminent, are the direct results of the development of his powers of observation, memory, curiosity, imagination, and reason.

Unfortunately the number of people efficiently using language to harness the powers of their brain is rather small. Commenting on this Darwin (p. 323) citing Henry Maine wrote, "The greatest part of mankind has never shewn (sic) a particle of desire that its civil institutions should be improved." Robinson (1971, p. 16-17) put it this way:

> Those to whom a commonplace appears to be extra-ordinary are very rare, but they are very precious, since they, and they alone, have built up our minds. It is they who through hundreds of thousands of years have gradually enriched human thought and widened the gap that separates man from his animal relations.

Without them the mind as we know it would never have come into existence. They are the creators of human intelligence. The mass of mankind must perforce wait for some specially wide-eyed individual to point out to them what they have hitherto accepted as a matter of routine or failed altogether to notice.

These mind-makers are the questioners and seers. We classify them roughly as poets, religious leaders, moralists, storytellers, philosophers, theologians, artists, scientists, inventors. They are discoverers and pointers-out. What eludes the attention of others catches theirs. They form the noble band of wonderers. Commonly unnoticed things excite a strange and compelling curiorsity in them, and each new question sets them on a fresh quest. They see where others are blind, they hear where others are deaf. They point out profunditites, complexities, simplicities, involutions, analogies, differences and dependencies where everything had seemed as plain as a pike staff.

The creators of human intelligence use language; it guides their eyes; it opens their ears; it sensitizes their skin; it synthesizes their tastes and smells. Language can be used to command the brain to synthesize all the input of the senses. This makes a person whole enough to be a philosopher, a story-teller, a prophet, a scientist, an artist. Language lights the wonderer's road so he can walk with those who have lived, with those who are alive, and with those who will live. Until one has walked with all of these his life will not be full.

Darwin and Robinson correctly observed that most humans fail to fill themselves before they die. The depth of the human experience is a measure of how fulfilled each person is at death. Only with a literate use of language can a person enrich the human experience and fill his destiny.

The major goal of instruction should be to teach how to apply the literate use of language in commanding the brain to process information. The literate use of language deperceptualizes the brain for the processing of the information. When the attention of the brain is not constrained by perceptual stimuli in the processing of current input, it can sweep through its "file" of past experiences and anticipate future events.

Deperceptualizing increases or enhances the retention of information. Input registered in short-term memory is more readily transferred to long-term memory if a person uses language in the process. Instruction should direct the development of the language competence which enhances the transferring of information from short-term memory to long-term memory. If this transfer does not occur, a person will behave in the future as if the experience never occurred. Too often teaching is directed only at short-term memory.

One of the major purposes of language is to facilitate transferring of information from short-term memory to long-term memory. This human capacity is responsible for culture and educational institutions. If humans were unable to deperceptualize with language, social and psychological behaviors would be controlled hereditarily.

A culture remains progressively viable as long as there is in that society an intelligentsia who use language to deperceptualize in the pursuit of knowledge. The modern cultures of the twentieth century are founded upon the deperceptualization that occurred during the seventeenth century. During this century such great thinkers as Galileo, Gilbert, Kepler, Harvey, Boyle, Newton and Lieuwenhoek generated the ideas that broke the bounds of the static medieval, occidental cultures.

Historical philosophers like Spengler, Toynbee and Hegel have attempted to describe the rise and fall of civilizations. Spengler saw civilizations as being born, maturing and dying as living things do. Toynbee proposed that civilizations arise only when a people respond to a challenge or challenges. The responses are directed by a creative minority. A civiliization collapses when the genius of the creative minority is spent. Hegel saw a civilization going through three stages--1) the rule of the single despot, who alone is free. 2) The rule of a single class, which alone is free. 3) The rule of all the people, who are free.

Literacy is required for all the people to be free. Literacy is required for a person and a civilization to mature and for the civilization to remain viable. Literacy prepares people to be creative and its continued acquisition by citizens assures that creativity is never spent. Literacy is civilization. Without it, a people cannot sustain their culture; without it, the people slip back into the shackles of perceptions.

This brings us to the state of literacy in America today. The decade of study conducted by the National Assessment of Educational Progress (NAEP) revealed that "The overwhelming majority of students lacked strategies for analyzing or evaluating in the interest of deepening their understanding of what they read" (NAEP, 1981a, p. 1). Current instruction in literacy is not preparing students to deperceptualize. They remain perceptually bound as they read. They process information only within the constraints of perception.

NAEP Data: Reading Theories and Models

The literacy data collected by the National Assessment of Educational Progress (NAEP) reflect how perceptually bound students were during the decade of the 1970's. Using a four-step model to analyze the extent of comprehension achieved by 9-year-olds, 13-year-olds and 17-year-olds, it was discovered that students:

1. Achieved enough initial understanding for:
2. preliminary interpretations, but were unable:
3. to reexamine the text read in order:
4. to extend and document the initial comprehension.

To reexamine a text in order to extend and document initial comprehension requires deperceptualization from the immediate text. The NAEP subjects were generally unable to use language as a means to achieve deperceptualization during the 1971, '75 and '80 data collecting periods for 9- and 17-year-olds; and during the 1970, '74 and '79 sessions for 13-year-olds.

These results should not be construed to be an indictment of reading teachers. They may be interpreted and defended as an indictment of the various perceptual theories which have shaped twentieth century reading research, methodologies and instructional materials. The perceptual psychologies of the behavioristic and the Gestalt/cognitive-field schools stress the visual input required for reading to the extent that proficient reading is seen as occurring almost without input from language.

The thesis of this paper is: A reader must use language to command his or her intellect to perform the cognitive skills necessary to reexamine a text in order to extend and document the initial comprehension. The corollary is: Perceptual theories are not powerful enough to generate the instruction essential to guide students in developing the cognitive skills necesaary to analyze texts in the interest of deepening their understanding of what they read. Language is a more powerful tool than perception is. It frees the brain from dependence upon current stimuli, permitting it to draw upon past experiences as well as knowledge. Language may be used to free humans from the dominance of perception.

Perception may have come to be accepted as a distinctive feature of the reading process because reading specialists found in it an identity that defines their discipline as being different and separate from other components of the language arts. The most extreme forms of this perceptualism are expressed in programs designed to develop neurological organization (Delacato, 1963, 1966, 1959), to establish a firm motor and perceptual base (Barsch, 1965; Bateman, 1965; Dunning & Kephart, 1965; Getman, 1965; Kephart, 1960) and to develop specific perceptual skills (Frostig, 1965; Frostig & Horne, 1965, 1964; Frostig, Lefevre & Whittlesey, 1964; Kirk & McCarthy, 1961).

Research has failed to validate the basic claims made by proponents of these programs. However, the applications of the procedures proposed by these instructional fads of the 1960's yield some learning. It is difficult, if not impossible, to develop a systematic program that would not yield some degree of some form of learning. The most effective forms of instruction are those which yield the greatest degree of learning and result in the knowledge being retained by the learners who apply this knowledge in the general experiences and specific challenges of life.

Duggins (1958, 1968) proposed an instructional strategy that teaches "children to read through the use of the same perceptual skills developed initially in learning to talk" (1968, p. 12). Duggins (1968, p. vi) stated as one of the major premises for her method the assertion that "The reading experience for the child will be internalized. To internalize the reading experience for the child means to incorporate in into the muscles of his body; to utilize his hands and feet in developing the spatial relationships of reading. A word will become something a child can feel and manipulate as well as something he sees."

It is reasonable to conclude that Duggins' program develops metalinguistic awareness rather than incorporating anything into the muscles. The activities Duggins (1968) suggests for teaching where sounds are in words and counting sounds in words may develop the phonetic segmentation abilities that theoretical researchers like Clark (1976), Downing (1979), Elkonin (1973), Hall (1976), Helfgott (1976), Liberman and Shankweiler (1977), Liberman (1973), Liberman et al. (1967), Savin (1972), Shankweiler and Liberman (1976) and Zifcak (1976) believe to be cognitive prerequisites for reading. Savin believes there is no point in trying to teach a child to read who cannot develop the awareness of phonemes that letters or combinations of letters represent. Such teaching is futile whether or not a child's perceptual processes recognize phonemes at an unconscious level.

Duggins' "perceptual" techniques may also help children acquire awareness of syllables and words. Extending metalinguistic abilities may reduce what Vernon (1957) describes as being cognitive confusion. Vernon (1971) believes that developing metalinguistic awareness eliminates the cognitive confusion that creates reading disability. According to scholars like Downing, Ollika and Olives (1977, 1975), Downing (1979), Evanechko (1973), Fitts and Posner (1967), Mattingly (1972) and Reid (1966) metalinguistic awareness yields the cognitive clarity related to writing systems one needs to acquire his or her potential in literacy.

Since there is a possibility that Duggins' suggestions for initial reading instruction may in an indirect way help prevent cognitive confusion, it is reasonable to conclude that those procedures proposed by Orton (1928, 1937), Gillingham and Stillman (1956, 1960) and Fernald and Keller (1921, 1943) may help clear it up. While Duggins suggests the involvement of the whole body in beginning reading instruction, the Orton-Gillingham and the Fernald approaches recommend feeling one's own speech organs while in action (Orton-Gillingham) and tracing letters with a finger (Orton-Gillingham & Fernald). Fernald's techniques were refined until they became known as VAK amd VAKT (visual, auditory, kinesthetic, tactile). The perceptualism that led to VAKT generated interest in learning modalities. Staples (1972, pp. 413-14) gave the following principles to keep in mind when selecting and applying various modes of learning:

1. Every individual is truly a unique learner.
2. If a student appears to learn better by one modality than another, instruction should usually emphasize the introduction of new material through the stronger modality while strengthening the weaker modalities through "readiness" activities.
3. Although it is often difficult to separate the various modes of learning for particular words or other reading skills, a single

mode should be emphasized, and the student should be given sufficient time to profit from the use of one mode before trying another.

4. Whatever mode is emphasized, organization, structure, and consistency should be considered.
5. The timing of methods and activities must be suitable for the individual student's needs.
6. Mode may be cultural and experiential as well as constitutional.
7. Much understanding of individual modes of learning can be gained through the student's own insight into his learning process.
8. Each activity should have a purpose commensurate with the student's needs in reading and his mode of learning.
9. Walters and Kosowski (1963) have suggested that such factors as need for incentive and/or reward and a reduced ability to attend to stimuli may affect a retarded reader's ability to use various modes of learning.

On this topic Robeck and Wilson (1974, p. 137) wrote: "The physiology of the brain establishes a continuous interaction of motor, visual, and auditory systems. The research seems to suggest not only differences within individuals in the modality functioning, but a possibility that knowledge of comparative modality strengths can be utilized in reading instruction. The dominant modality should be the basis from which associations to other sensory systems are formed . . . The teacher uses the perceptual strengths of the individual student and broadens these to other modalities as the student functions successfully in multisensory situations." Mills (1955) developed an instrument, Learning Methods Tests, to use in identifying the mode in which a learner has the greatest strength.

In the Reading Clinic at the University of Chicago, the Monroe Reading Aptitude Tests, the Intermediate Form of the Monroe-Sherman Group Diagnostic Reading Aptitude and Achievement Tests, the Gates Associative Learning Tests, and the revised edition of the Mills Learning Methods Tests, Huelsman Word Discrimination Test and the Wepman Auditory Discrimination Test have been used to help identify modes of learning (Staples, 1972).

Thus, we can see that perceptual emphasis in reading is not limited to a few proponents of esoteric and inexplicable ideas related to neurological organization, a firm motor and perceptual base and the devlopment of perceptual skills. Perceptualism is pervasive in the text materials and clinical experiences used in the training of reading specialists.

Perceptualism shapes the models designed to depict the reading process. Stanovich (1982) described these models as either being "bottom-up," "top-down," or a hybrid of these two. The hybrid form is interactive. Most models portray perception as being either the passive or active force that propels the reading process. Downing and

Leong (1982, p. 155) see the role of perception in reading research thus: "For many years work on perception and reading dealt more with the surface aspect of recognition and discrimination . . . more current studies have related word perception directly to the extraction of meaning, . . . modern research on getting meaning from printed words generally follows an information-processing model."

The most replete catalogue of perceptualism in reading is Singer and Ruddell's (Eds., 1976) 758 page volume on theoretical models and processes of reading. Model after model is discussed with each author marching to a small difference in the beat of perceptualism. Each minute variation on how visual perception puts information into the brain to be processed ends like putting data into a computer without including a header card to tell the computer how to process the data. Thus, instruction based upon these models has enough power to achieve only the comprehension necessary to reach step two in the four-step model used to evaluate reading comprehension in the NAEP analyses:

1. Initial comprehension, leading to
2. Preliminary interpretations, followed by
3. A reexamination of the text in light of these interpretations, leading to
4. Extended and documented interpretation.

The great dabate Chall (1967) examined in detail as well as the more current synopses of research edited by Murray and Pikulski (1978) and Singer (1982) discussed few, if any, of the facets in the reading process that require comprehension beyond level two of the above model. The perceptual continuum on which botton-up/top-down theoreticians position themselves may have a hierarchy of skills such as:

Top-down

	3.	mental images
Semantics	2.	thoughts in words
	1.	concepts: relations/constraints
	3.	clause markers--clauses
Grammar	2.	phrase markers--phrases
	1.	Inflections--tense, plurality, possession, comparative/superlative
	3.	Derivation suffixes
Syntax	2.	Word order
		sentence
	1.	Punctuation marks
	5.	morphemes: prefixes/root words
	4.	words
Graphic Code	3.	syllables
	2.	spelling patterns
	1.	graphemes/letters

bottom-up

Interactive theories and models stress that readers vary in how and what graphic, phonological, syntactic, grammatical and semantic information are incorporated in the act of reading. While one reader may use item 2 and 4 in graphic code, item 1 in syntax, item 2 in grammar and item 3 in semantics, another may begin with item 4 in graphic code, use none in syntax, and make use of item 1 in grammar and 1 in semantics. Rumelhart (1977) believes that a fluent reader may respond simultaneously to distinguishing graphemic features and spelling patterns, as well as attending to phonological, lexical, syntactic and semantic constraints. While Rummelhart recognizes that propositions generated by interactive models need to be verified, Stanovick (1980) suggested that they more accurately portray the processes entailed in reading.

Theoreticians who see reading as an interactive process prefer to think in terms of reading skills as being hierarchial or conditional (Turvey, 1973, 1975) rather than being hierarchical. Rumelhart (1977a) proposed a model that depicts reading as an interactive process that requires the reader to attend only to those features essential to achieve comprehension. This is not a dipping-into process in which the reader begins at the top of a hierarchy of skills (semantic level) and dips down into the lower skills as required to verify or confirm the semantic concepts the reader is cognitively manipulating in order to sustain the act of reading.

Those who (Goodman, 1976; Kolers, 1970; Smith, 1978) describe reading as being concept-driven basically agree with Rumelhart's (1977b, p. 268) definition of the process of achieving comprehension as being "identical to the process of selecting and verifying conceptual schemata to account for the situation (or text) to be understood." Downing and Leong (1982, p. 213) briefly defined schemata as being "mental structures or abstract representations which provide interpretations for inputs in different modalities." Morton (1980, 1979a, 1979b) coined the word "logogen" which refers to a schema for a specific word. Morton (1979a, p. 112) in describing this term wrote, "A logogen is not a word; it is the device which makes a word available as a response and it does so by collecting evidence that the word is present as a stimulus, appropriate as a response, or both."

Concepts represented by words like schemata and logogen are postulated in order to explain features of perception. Top-down theorists posit semantics as the perceptual guide for reading. Smith (1978) stresses the role of non-visual information in the act of reading. He believes (p. 26) "it is the brain that determines what we see and how we see it." Therefore, reading is guided by internal rather than external information. In a footnote, Smith (p. 27) explains: "The only part of vision of which we can ever be aware is the final sensation of seeing, constructed by the brain by its own private and mysterious process." Smith (p. 204) posited the ratio between nonvisual and visual information in the reading process to be at least 3:1. He put it this way: ". . . when reading sequences of meaningful words in text, the reader can contribute at least three parts nonvisual information. . . ." Smith does not explain what schemata or logogens make it possible for the reading process to be sustained mostly by nonvisual information.

Meaning is the general term Smith uses to allude to the three parts of non-visual information required for fluent reading. He (p. 234) cites Klein, Klein, and Bertino (1974), Golinkoff (1975-76) and Doehring (1976) as having conducted studies that demonstrate the readiness of children to make use of context in early reading. However, Smith does not believe beginning reading instruction is conducive to permitting a child to use context. He cites a study by Rosinki, Golinkoff and Kukish (1975) that he purports to show that "meaning is irresistible to children; it can interfere with performance on a task because they cannot ignore it."

Smith (3, 9) is adamant in his position "that there is no essential difference between learning to read and reading." He believes, "There are no special kinds of skills that a child must learn and exercise that are involved in fluent reading, nor is there any part of fluent reading that is not a part of learning to read . . . . The main difference between beginning to read and fluent reading is that the beginning exercise and rote learning play little part in learning to read and in fact may interfere with comprehension. The function of the teacher is not so much to *teach* reading as to help children read."

A model based upon Smith's view of reading could not be interactive because along with ruling out word identification (p. 233, *Reading does not usually involve or rely upon word identification*.) He also excludes grammer (p. 214, *grammar is not the bridge to meaning*). He also declares (p. 164) children "do not need to learn special procedures for finding meaning." Smith barely fell short of proclaiming that humans are born with that automaticity of skills application that bottom-up theoreticians (Bryan & Harter, 1978/1973, 1899/1973; Dahl, 1975; Estes, 1972, 1975; Farnham-Diggory & Gregg, 1975; Laberge, 1973, 1975; Laberge & Samuels, 1974; Oliver, 1976; Willows, 1974; Willows & McKinnon, 1973) believe over-learning is necessary to achieve. Singer (1982, p. 23) wrote, "automaticity denotes the absence of conscious attention and the resistance of that skill to expectations."

Smith appears to accept rather than speculate as Murray did (1978, p. ix) when he wrote: "If from the beginning of the child's life the primary medium of social communication were writing and reading instead of speaking and listening, and if from the beginning the child were submerged in a bath of print instead of speech and was forced to communicate solely through writing and reading, we might find that reading would develop as naturally as we find language and speech developing in children." Goodman, another top-down theorist, allowed for more interaction than Smith does. Goodman, Goodman and Burke (1978) explained how three cuing systems (graphophonic, syntactic, semantic) drive or sustain the reading process. Earlier Goodman (1976, p. 498) described reading as being a psycholinguistic guessing game. More specifically: "Reading is a selective process. It involves partial use of available minimal language cues selected from perceptual input on the basis of the reader's expectation. As this partial information is processed, tentative decisions are made to be confirmed, rejected, or refined as reading progresses." Goodman writes and proposes with the attitude of a scientist while Smith writes and proposes with the enthusiasm of a proselyte. Smith has made psycholinguistics a fad that may eventually generate reading problems serious enough to cause reasonable people to believe that another book like Flesch's (1955) Why Johnny Can't Read and What You Can Do About It has great merit.

Commenting on the value of psycholinguistics Goodman (1973a, p. 178) wrote:

> The value of psycholinguistics lies in the insights it can provide into the reading process of learning to read. As such, a 'psycholinguistic approach' to reading would be the very antithesis of a set of instructional materials. As we shall argue, psycholinguistic analysis formally confirms what we have all known intuitively for years--that the key factors of reading lie in the child and his interaction with information-providing adults, rather than in the particular materials used. Materials most compatible with such interaction are those that interfere the least with natural language functioning.

Fromkin's (1973) analysis of errors in linguistic units of speech closely corresponds to the miscues Goodman (1973b) reports occurring in oral reading. This confirms that oral reading is a natural function of language as Goodman contends. Goodman et al. (1978, p. 10) state:

"Reading is language. Language has two aspects--productive and receptive. It is always an interaction between the producer and the receiver. Both are interactive participants in communication. . . . So reading is a receptive written language process, one in which the reader constructs meaning, actively, from a printed display authored by a writer."

Biemiller (1977-78, 1970), Clay (1969), Weber (1976, 1970a, 1970b, 1968) and Williamson and Young (1977, 1974) are a few of the many who have conducted research using the same linguistic concepts Goodman has popularized. Biemiller, Clay and Weber's research corroborated Goodman's work which showed that the preponderance of the errors first graders make does not violate syntax. The influence of the child's language is apparent in the beginning stages of learning to read.

Williamson and Young's research showed that whether a child is monolingual or bilingual (Spanish/English) the more frustrated he or she becomes the more he or she depends upon the graphophonic cuing system. As the frustration decreases more use is made of the syntactic and semantic cuing systems. Biemiller (1970) concluded after studying the oral reading errors of a group of first-grade children from October to May that three stages of reading acquisition occurred. In the first stage, contextual information dominated reading. In the second stage more errors that were visual- or graphophonic-constrained occurred. Biemiller (1970) saw this stage as a transition period during which the children were moving from a context-using phase to a stage where the primary focus is on graphophonic information. In the phase Biemiller thought the children were trying to avoid using graphophonic cues. In the third stage the oral reading errors were both contextually and graphically restrained. Biemiller (1970, p. 95) concluded: "Data presented in this study indicate that the child's first task in learning to read is mastery of the use of graphic information. . . . The longer he stays in the early, context-emphasizing phase without showing an increase in the use of graphic information the poorer a reader he is at the end of the year."

Weber (1970a, 1970b) reported that 6-year-old children make use of grammatical and meaning cues to recognize words. Felzen and Anisfeld (1970) report that third- and sixth-grade students increasingly use semantic rather than graphophonic features in word recognition. Kolers (1970) found that competent readers avoid syntactic and semantic error when attempting to read materials too difficult for their level of knowledge.

When readers make more use of graphophonic cues, it does not necessarily follow that the errors will not be syntactically appropriate. Fromkin's work with speech errors shed light on the errors made in oral reading. The miscue anaylsis of reading performance confirms that the reader uses the same linguistic competence used when speaking. Thus, language anomalies produced in response to linguistic symbols are no different from those generated in response to other types of external or internal stimuli.

Summary

Neither the bottom-up, the top-down nor the interactive portrayal of the reading process attends to the use of language as a means for deperceptualizing. Each perceptually constrains the reader's intellect to varying degrees. Perhaps Gibson (1966, p. 47) alluded to the most extreme view of reading being alingual when she wrote, "If we are correct in thinking that the child comes to discriminate graphemes by detecting their distinctive features, what is the learning process like? That it is perceptual learning and need not be verbalized is probable . . . ." The great debate Chall wrote about (1967, 1979) addressed and continues to address the issue: How much visual perception is required to sustain the reading process?

Adherents of behavioristic psychology usually emphasize that visual input is the greatest contributor to reading; cognitive psychologists stress that the brain, not the eyes, propels the process while the eclectic psychologists propose that readers slide back and forth on a continuum of visual input. When perceptual input becomes void of language, the reader may be as inefficient in processing information as many congenitally deaf people are. Surely, the purpose of learning to read should not be to return humans to the prelinguistic cognitive state of the species. Unfortunately, some bottom-up theorists propose that reading is achieved when verbalism is produced, a type of verbalism the congenitally blind often falls prey to.

Downing and Leong (1982, p. 155) described reading research this way: "For many years work on perception and reading dealt more with the surface aspect of recognition and discrimination . . . more current studies have related word perception directly to the extraction of meaning, . . . modern research on getting meaning from printed words generally follows an information processing model. Information-processing models portray speech as being a possible alternative." Smith and Spoehr (1974) presented an interactive model of reading that portrays reading as information-processing. This model summarizes the reading process as being parallel coding by multiple paths and shows the interplay between the different routes in assessing word meaning. The reader as an information processor has the option of using the route that satisfies the purpose of reading, the demands of the task and the level of his skills achievement.

The interactive and the top-down theorists appear to be describing fluent reading as being more or less a linguistic process. The top-down theorists may be able to clarify their position by using Vygotsky's (1962) concept of inner speech to describe how a fluent reader applies his linguistic competence. If a reader does make use of inner speech, then reading is communicating with one's intellect, and not with the thoughts of a far-removed author. Efficient reading should put one in control of his brain. Smith and Spoehr (1974) seem to imply that readers have some control over their brain while they read. The Goodman (1976) thesis implies this less clearly while Smith (1978) portrays the reader as being as much a victim of his brain as the perceptualists see him being a pawn of visual perception.

It is self-evident that neither the perceptualists nor Smith offer a resolution for the major literacy problems the NAEP data have defined. The solution will come when reading is studied as a process driven by language rather than perception or intuitive cognition. Huey (1968) at the turn of the century (1908) was more cognizant of the role of language in reading than are most current scholars. He made several references to the function of inner speech in reading. A synthesis of what he wrote follows:

> . . . If we watch closely, we are apt to find some sort of inner utterance of what is being read, and we have a notion of the meaning of it all, although we cannot very well describe this consciousness of meaning (p. 24) . . . Purely visual reading is quite possible, theoretically; and Secor, in a study made at Cornell University, found that some readers could read visually while whistling or doing other motor tasks that would hinder inner speech. We might perhaps all have learned a sort of visual reading, and might yet require ourselves to read so in a measure. But although there is an occasional reader in whom the inner speech is not very noticeable, and although it is a far shortened and incomplete speech in most of us, yet it is perfectly certain that the inner hearing or pronouncing, or both, of what is read, is a constituent part of the reading of by far the most of people, as they ordinarily and actually read (117-118). . . .
>
> In many cases these experiments (Huey's research) brought the

readers to an awareness of their inner speech in reading when this had gone unnoticed before. When asked to say the words over to themselves, they found that really this was what they had been doing all along in their ordinary reading, and was the one thing they could not escape doing when they tried. . . . In such cases, the time required for reading a page in the assigned way would be nearly the same as when the page was read 'the way you like to read.' In the same way the reader's habit of hearing the sound of what he read, or of using lip-movement, etc., was often revealed. Of nearly thirty adults who were thus tested, the large majority found inner speech in some form to be a part of their ordinary reading. Purely visual reading was not established for any of the readers, although the test did not show that it was not present for a few (119). . . .

In so far as the cues from the printed page set off the recognition of phrases and sentences as wholes, they do this more readily for the habits of sequence and expectations which exist among words according to grammatical and logical usages. . . . Our words are thoroughly organized according to these general associative habits of our language, and when any given series has occurred in our reading, the sort of words and sentence forms that belong in sequence with these are subexcited in advance of their appearance on the page, and need but slight cues from the page to cause them to spring into the perceptual consciousness. . . . But though the

> phrase or sentence has never occurred in reading before, in exactly its present wording, the inner readiness for it is almost as complete; and it will inwardly complete itself almost as readily from a few visual cues, if it is cast in a familiar form, if its words and parts of speech stand in familiar grammatical sequences, so that each associatively helps the other to rise and remain in consciousness. . . . And even while people read, the talking habits are doubtless getting more effective practice in the inner speech than are the visual habits in visual perception, for all but persons who are strongly visual-minded. Even in silent thinking, clothed in a sort of language as the process always is, the organization of our speech habits goes on perfecting itself (142-143). . . . While, . . ., the purely visual habits of inter-association and expectancy play an important part in enlarging our perceptive range and in unitizing our phrases and sentences the visual range is itself enlarged and its content supported by the more stably organized inner utterance into which the visual percepts are constantly being translated. The carrying range or span of the inner speech is considerably larger than that of vision. (144)

On the subject of inner speech, Huey preceded and anticipated Vygotsky (1962). A synthesis of how Huey saw inner speech functioning when reading with how Vygotsky described its use in thinking reveals how linguistically dynamic the reading-thinking process could and should be. In describing inner speech Vygotsky (p. 149) wrote:

> Inner speech is not the interior aspect of external speech--it is a function in itself. It still remains speech, i.e., thought connected with words. But while in external speech thought is embodied in words, in inner speech words die as they bring forth thought. Inner speech is to a large extent thinking in pure meaning. It is a dynamic, shifting, unstable thing, fluttering between word and thought, the two more or less stable, more or less firmly delineated components of verbal thought.

The highest forms of literacy cannot be achieved without the use of inner speech. Thoughts that initiate and sustain scholarly writing break into consciousness through inner speech. Inner speech holds thought at the conscious level; it is used in the polishing and refining processes until they are ready for external speech and the literate form of language. Reading that is not driven by perception alone reduces the literate form of language to the idiosyncratic structure of the reader's inner speech.

We experience in the highest forms of literacy the cognitive struggle primitive humans enjoyed as language evolved for the species.

Wolf (1980, p. 84) has reminded us "that reading is no more than a mental interaction with the written word--is actually rather new; new that is, when one considers the etymology of the word." The original meaning of reading included "to advise, to interpret, to explain." Twentieth century perceptualism has reduced reading to a phonological reproduction of the phonetic code represented by graphemes.

Olson (1980, p. 85) has explained how literate language differs from speech. He wrote, ". . . there is a transition from utterance to text both culturally and developmentally and that this transition can be described as one of increasing explicitness, with language increasingly able to stand as an unambiguous or autonomous representation of meaning." He believes that literacy's contribution to the human race is not the same as that made by speech. He put it this way: ". . . speech makes us human and literacy makes us civilized" (p. 84).

Scribner and Cole (1980) in a study to determine what cognitive contribution literacy makes to human intellectuality analyzed literacy-cognitive performance for a West African people referred to as the Vai. As they studied literacy among the Vai, they were cognizant of the current dominant belief that literacy leads inevitably to higher forms of thought. The Vai acquire literacy without formal schooling.

Scribner and Cole (p. 390-91) found "that skills involved in literacy behaviors are indeed transferable to behaviors unrelated to literacy. The effects reported--anaylzing oral speech and giving clearer instructions--are neither self-evident nor trivial. Speech perception and instruction have real utility. These studies provide the first direct evidence that what an individual does with text, or with pencil and paper, can promote specific skills that are available to support other behaviors . . . , (It) stands as the first clear-cut evidence in a present-day society that personal engagement in reading and writing does have psychological consequences. These consequences . . . are all highly specific to activities with the Vai script." These two researchers concluded that "certain literacy practices among the Vai produced intellectual outcomes closely tied to those practices" (p. 391).

Scribner and Cole (p. 391) did not find "that literacy in the Vai script was associated in any way with generalized competencies such as abstraction, verbal reasoning, or metalinguistic skills." Perceptual approaches for the teaching of literacy, whether they be self-instruction or taught by a teacher, cannot develop metalinguistic awareness since such approaches deemphasize language. This deemphasizing of language has in part produced the reader profile the NAEP data delineated. In order to change the current profile of the readers in the American schools, suggestions like the following must have greater influence in the teaching of reading.

1. Language must be accepted as the system nature evolved for humans so they could exercise control over and give commands to the brain.
2. The language of literacy must be recognized to be that of inner speech. Formal writing originates with inner speech which is expanded and refined until an acceptable standard of literate language is expressed; formal writing does not evolve toward speech. A reader reduces the literate code to fit the structures of his idiosyncratic inner speech.

3. The analyzing of the literate code should begin with initial reading and writing instruction in order to avoid the cognitive confusion described by Downing (1979). Metalinguistic skills enable one to use language to command the brain more precisely.
4. While automaticity in responding to perceptual stimuli on a page of print is essential, the teaching of reading must be flexible enough to permit each student to plug into his own idiosyncratic inner speech.
5. Reading instruction must make use of all types of printed materials from its inception.
6. School districts should cease purchasing instructional manuals that accompany reading materials so teachers may experience the real need to develop the metalinguistic awareness required to be competent when using all types of materials in teaching reading.
7. The curriculum and text materials used to prepare pre-service and in-service teachers to teach reading must be designed to develop metalinguistic awareness. All teachers must become more competent in using language to command their own intellects and must acquire the techniques that will help them teach students how to use language for this purpose.

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